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A

COMPLETE DICTIONARY

OF

PRACTICAL GARDENING:

COMPREHENDING ALL THE

MODERN IMPROVEMENTS IN THE ART;

WHETHER IN THE

RAISING OF THE VARIOUS ESCULENT VEGETABLES,

OR IN THE

Forcing and Managing of different Sorts of Fruits and Plants,

AND THAT OF

LAYING OUT, ORNAMENTING, AND PLANTING,

GARDENS AND PLEASURE GROUNDS:

WITH

CORRECT ENGRAVINGS

OF THE NECESSARY APPARATUS, IN BUILDINGS AND OTHER CONTRIVANCES, AS WELL AS OF THE MORE RARE AND CURIOUS PLANTS CULTIVATED FOR ORNAMENT OR VARIETY:

FROM

Original Drawings by Sydenham Edwards.

By ALEXANDER McDONALD, Gardener.

IN TWO VOLUMES.—VOL. II.

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Mr. and Mrs. James M. Codman.

Nov. 24. 1876.

25,

A

GENERAL DICTIONARY

OF

PRACTICAL GARDENING, &c.

JACA TREE. See ARTOCARPUS.

JACK-IN-A-BOX. See HERNANDIA.

JACQUINIA, a genus containing plants of the shrubby exotic kind for the stove.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Dumosæ*.

The characters are: that the calyx is a five-leaved perianthium: leaflets roundish, concave, permanent: the corolla is one-petalled: tube bell-shaped, ventricose, longer than the calyx: border ten-cleft: divisions roundish, of which the five interior ones are shorter: the stamina have five awl-shaped filaments, arising from the receptacle: anthers spear-shaped: the pistillum is an ovate germ: style the length of the stamens: stigma headed: the pericarpium is a roundish acuminate berry, one-celled: the seed single, roundish, and cartilaginous.

The species cultivated are: 1. *J. armillaris*, Obtuse-leaved Jacquinia; 2. *J. ruscifolia*, Prickly Jacquinia.

The first is a very elegant upright shrub, seldom more than four or five feet high: the trunk round, thicker, and knobbed where the branches come out, covered with an ash-coloured bark: the branches four or five from each joint towards the top, in whorls, spreading, stiff, round, grooved, brittle, hoary, subdivided, and forming altogether a neat globular head: the leaves scattered, alternate, petioled, clustered towards the ends of the twigs, wedge-shaped, ovate, obtusely margined, quite entire, veinless, smooth, pale underneath, with very minute black dots: the racemes terminating, commonly shorter than the leaves, about two inches long, solitary, erect, loose, simple, seven-flowered, or thereabouts: the peduncles scattered, spreading, one-flowered: the flowers small, stiffish, white, smelling like Jasmine, and retaining their sweet scent several days. It is a native of South America, flowering in February and March.

The second species is a shrub three feet in height, having the habits of the first; but it differs in the leaves being lanceolate, acuminate, pungent, extremely stiff, and one-flowered. It is a native of South America, flowering in January and February.

Culture.—These plants are capable of being increased by sowing the seeds, procured from their native situation, in pots of light earth, in the spring season, plunging them in a bark hot-bed. When they have attained a few inches in growth, they must be removed into separate pots, and be replunged in a hot-bed in the stove, where they must be constantly kept.

They may likewise be raised by planting cuttings of the young shoots, in pots of the same sort of earth, in the early spring, plunging them in the bark hot-bed, as in the other case; but in this way they are raised with difficulty.

They afterwards require to be carefully managed, by having little water given in the winter time, but a free admission of air during the hot summer season, and occasional refreshings of water.

They afford variety in stove collections.

JASMINUM, a genus containing plants of the hardy and tender deciduous and evergreen shrubby kinds.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Sepiariæ*.

The characters are: that the calyx is a one-leafed perianthium, tubulated, oblong: mouth five-toothed, upright, permanent: the corolla one-petalled, salver-shaped: tube cylindric, long: border five-parted, flat: the stamina have two short filaments: anthers small, within the tube of the corolla: the pistillum is a roundish germ: style filiform, length of the stamens: stigma bifid: the pericarpium is an oval berry, smooth, two-celled, or two-capsuled: the seeds two, large, ovate-oblong, arillated, convex on one side, flat on the other.

The species cultivated are: 1. *J. officinale*, Common White Jasmine; 2. *J. fruticans*, Common Yellow Jasmine; 3. *J. humile*, Italian Yellow Jasmine; 4. *J. odoratissimum*, Yellow Indian Jasmine; 5. *J. grandiflorum*, Spanish, or Catalonian Jasmine; 6. *J. Sambac*, Arabian Jasmine; 7. *J. Azoricum*, Azorian Jasmine.

The first has a shrubby, weak, climbing, round, smooth, branching stem: the leaflets usually seven, broad, lanceolate, quite entire, smooth, dark green, the end one larger and more pointed than the rest: the peduncles few-flowered: the calycine segments capillary: the corolla white and odorous: the flowers appear most part of summer. Its native country is not well ascertained; probably the East Indies.

It varies with white striped leaves, and with yellow striped leaves.

The second species has weak angular branches which require support, and rise to the height of eight or ten feet, if planted against a wall or pale: the leaves are trifoliate, simple, alternate: the flowers are yellow, coming from the sides and ends of the young branches. It is a native of the south of Europe. It sends out numerous suckers from the roots.

The third has shrubby firm stalks and angular branches, of low strong growth, and bushy: the flowers are generally larger than those of the preceding, but have very little scent, and are seldom produced so early in the season: the simple leaves are frequently intermixt with the ternate ones. Its native country is not known; but it flowers from July to September.

The fourth species rises with an upright woody stalk eight or ten feet high, covered with a brown bark, sending out several branches, which want no support: the leaflets are of a lucid green, ovate and entire, continuing green all the year, the two side ones much less than the end one: the flowers are produced at the ends of the shoots in bunches, of a bright yellow colour, and a most grateful odour. It is a native of the island of Madeira, flowering from July to October and November, which are frequently succeeded by oblong oval berries.

The fifth has much stronger branches than the first sort: the leaflets are placed closer, and are of a lighter green; the side ones are obtuse, but the odd one ends in an acute point: the flowers are axillary, on peduncles two inches long, each sustaining three or four flowers, of a blush red on their outside, but white within. It is a native of the East Indies, flowering from July to November.

The sixth species rises with a winding stalk to the height of fifteen or twenty feet, sending out many small branches: the leaves are smooth, near three inches long, and almost two broad, of a light green, on short foot-stalks, ending in acute points: the flowers are produced at the end of the branches, and also upon the side shoots, on short peduncles, each generally sustaining three flowers, the two lower opposite, and the middle one longer: these flowers are of a pure white, and have a most agreeable odour, somewhat like orange flowers, but sweeter; when fully blown they drop out of their cups upon being shaken, and frequently fall out in the night, changing soon to a purplish colour: the plants continue flowering great part of the year, when they are kept in a proper temperature of warmth. It is a native of the East Indies.

There are varieties of it with single and double flowers, and with large double flowers.

The seventh has longer slender branches, which require support, and may be trained twenty feet high: the leaves are of a lucid green, continuing all the year: the flowers terminating, in loose bunches, of a white colour, and very agreeable scent. It is a native of the Azores, flowering from May to November.

Culture.—The first sort is readily increased by layers or cuttings. The young branches should be laid down in the early autumn, and in the following autumn be taken off, and planted where they are to grow. The cuttings of the young shoots may be planted either at the same time or in the early spring, being protected in the first case, in severe weather, in the winter. When they are well rooted, they may be removed, with balls of earth about their roots, to the places where they are to grow.

The different varieties are increased by budding, or grafting them upon stocks of the plain or common kind. See BUDDING and GRAFTING.

The common sort must be planted against walls, pales, or other fences, that may serve as a support. When planted as a standard, it is difficult to train to a proper head, and keep in order, without destroying the flowering branches which are the extremities of the same year's shoots. On this account they should be permitted to take their natural growth in the summer, and not pruned or nailed till towards the latter end of March, when the frosts are over, to prevent their being injured by them.

The varieties should be planted in a warmer situation, with a southern aspect, than the common sort, especially the first, which, in very severe winters, should be protected with mats.

The second sort may be increased by layers, or planting the suckers taken from the roots, in the spring or autumn. The layers may be made as in the first sort.

The third sort is capable of being propagated either by budding or inarch-grafting upon stocks of the second kind, or by layers of the young tender branches made in the autumn or early spring seasons; but the former is the better practice, as producing more hardy plants. It should have a rather warm aspect, as a south wall, and, in very severe winters, have the protection of mats.

It requires the same pruning as the first sort.

The four following sorts are more tender.

The first of them may be increased by seeds or layers of the young shoots. The seeds should be sown in the early spring, in pots of fresh light earth, plunging them in a moderate hot-bed, and when the plants are up, removing them into a second hot-bed to forward them, giving them frequent slight refreshings of water, and gradually hardening them to the full air. They should be occasionally watered in the winter, and in the spring following be removed into separate pots, the earth being carefully preserved about their roots. Their first growth may be promoted by placing them in a mild hot-bed. They afterwards require a pretty free air, and slight protection from frosts in winter. They should have the decayed branches pruned out in the spring, without the others being shortened, as the flowers are produced at the extremities of the branches.

In the layer method the young shoots should be laid down in the early spring, as about March, being slightly nicked underneath at a joint, and often slightly watered in dry weather. In the following spring they may be taken off, and planted out in pots filled with light earth, separately; being afterwards managed as the others.

They may likewise be raised by inarch-grafting into stocks of the second species; but the plants produced in this way are not so strong as those upon their own stocks, and they are apt to send out too many suckers from the roots.

The second of these tender kinds may be raised by budding or inarch-grafting upon stocks of the first species, which renders it more hardy than on its own: but the plants are mostly brought from Italy, in bunches of four together, and which, after having their roots moistened, and the shoots and dead parts pruned away, as well as the tops cut down to within a few inches of the grafted parts, may be planted in pots filled with light fresh earth, plunging them in a moderate bark hot-bed, shading them from the sun, and giving them water. When they begin to grow, all the shoots below the grafts should be rubbed off, and the top shoots cut off, free air being admitted, so as to gradually harden them to be set out in a warm situation. They must have the protection of the green-house in winter, and be frequently sparingly watered, a free air being admitted in mild weather.

The third of these tender sorts may be raised by layers and cuttings; but the first is the best method, as the cuttings require much care to make them strike. The young branches should be laid down in the spring, in pots filled with soft loamy earth, plunging them in a tan hot-bed, and watering them occasionally. In the autumn, when they have stricken root, they should be taken off, and planted out in separate small pots, plunging them in a hot-bed, due shade being given. The cuttings may be planted in pots of the same sort of earth during the summer, plunging them in a tan hot-bed, and covering them close with a bell or hand glass, due shade being given, and occasional waterings. When they have taken good root, in the beginning of autumn, they may be removed into separate pots, and be managed as those from layers.

These plants succeed best when kept in the stove.

The last of these sorts may be increased in the same way as the fourth species, and requires the same management afterwards.

The three first species may be employed as plants of ornament for covering walls, palings, and other naked erections about houses, as well as occasionally introduced as standards in clumps, borders, and other parts of pleasure-grounds.

The other sorts afford variety among other potted green-house and stove plants. Some may likewise be trained against warm walls or palings, especially the last kind, which has a fine fragrance.

JATROPHA, a genus containing plants of the flowering shrubby perennial kind.

It belongs to the class and order *Monoecia Monadelphia*, and ranks in the natural order of *Tricoccæ*.

The characters are: that in the male flowers the calyx is a scarcely manifest perianthium: the corolla one-petalled, funnel-form: tube very short: border five-parted: divisions roundish, spreading, convex, concave beneath: the stamina have ten awl-shaped filaments, approximated in the middle: the five alternate ones shorter, upright, shorter than the corolla: anthers roundish, versatile: the pistillum is a weak rudiment, latent in the bottom of the flower: female flowers in the same umbel with the males: calyx none: the corolla five-petalled, rosaceous: the pistillum is a roundish, three-furrowed germ: styles three, bifid: stigmas simple: the pericarpium is a roundish capsule, tricoccous, three-celled, cells bivalve: the seeds solitary and roundish.

The species cultivated are: 1. *J. gossypifolia*, Cotton-leaved Physic-nut, or Wild Cassava; 2. *J. multifida*, French Physic-nut; 3. *J. manihot*, Eatable-rooted Physic-nut, or Cassava; 4. *J. urens*, Stinging Physic-nut.

The first has the stem from two to three feet high, herbaceous, branched, smooth: the branches subdivided, round, beset at the base with branched glanduliferous cilias or bristles: the leaves are digitate, veined, tender, often three-lobed: lobes acute, serrate, toothed and ciliate; cilias glandular: the common peduncle terminating: partial cymed, bifid: male flowers very copious, females solitary, in the forks of the peduncles: in the males, calyx five-leaved: leaflets ovate, acute, ciliate: corolla deeply five-parted, dark purple: segments ovate: at the base of the stamens are five roundish nectareous glands. It is a native of the West Indian islands.

The second species grows generally to the height of five, six, or seven feet, with a very smooth fuffrutescent stem, and spreading branches: the stipules bristle-shaped, multifid at the base of the branches and petioles: the leaves alternate, subpeltate, multifid: the divisions pinnate, with the odd leaflet longer, smooth, but whitish underneath: the peduncles terminating, very long, round, thick, very smooth, subdivided: the pedicels coloured, in corymbs: the flowers small, red: males very numerous: females solitary, subsessile. It is common in most of the islands in the West Indies, flowering from June to July.

The third shoots from a tough, branched, woody root, whose slender collateral fibres swell into those fleshy conic masses for which the plant is cultivated; and rises by a slender woody knotted stalk to the height of four, five, or six feet, sometimes more: the leaves alternate, smooth, on long petioles, seven-lobed: lobes narrow at the base, growing broader till within an inch and half of the top, where they diminish to an acute point; the three middle lobes are about six inches long, and two broad where broadest; the two next are about an inch shorter, and the two outside lobes are not more than three inches long; the middle lobes are sinuated on each side near the top, but the two outer are entire: the flowers are produced in umbels at the top of the stalks, some male, and others female. It is a native of South America.

It is observed by Martyn, that "it grows to perfection in about eight months; but the roots will remain a considerable time in the ground uninjured. They are generally dug up as occasion requires, and prepared for use in the following manner: being first well washed and scraped, then rubbed to a pulpy farina on iron graters, they are put into strong linen or palmetto bags, and placed in a convenient press, until the juice is entirely expressed: the farina is then taken out and spread in the sun for some time, pounded in large wooden mortars, run through coarse sieves, and afterwards baked on convenient irons. These are placed over proper fires, and, when hot, bestrewed with the sifted meal to whatever size or thickness people please to have the cakes made: this agglutinates as it heats, grows gradually harder, and, when thoroughly baked, is a wholesome well-tasted bread. *Tapioca* is also prepared from this root."

The fourth species has a thick, swelling, fleshy root, from which arises an herbaceous stalk as big as a man's thumb, four or five feet high, and dividing into several branches; these are very closely armed with long brown spines: the foot-stalks of the leaves are six or seven inches long, which are also armed with spines, but not so closely, nor are the spines so long as those on the stalk and branches: the leaves are deeply cut into five lobes, which are jagged deeply on their sides, and the nerves are armed with stinging spines: the flowers are produced in umbels at the top of the branches, standing upon long naked peduncles; they are of a pure white colour: the male flowers appear first; they are five-petalled, forming a short tube at bottom, and spreading open flat above. It is a native of Brazil, flowering from May to July.

Culture.—These plants are all capable of being increased by seeds and cuttings.

The seeds should be sown in the early spring, in pots of light earth, plunging them in a mild hot-bed of bark. When they have attained a little growth, the plants should be pricked out into separate small pots, and be replunged in the hot-bed, a little water being given.

The cuttings should be made from the stalks or young branches five or six inches in length, and planted in pots of light earth in the spring or summer months, plunging them in the bark hot-bed. When they have stricken good root they should be removed with earth about their roots into separate pots, and be replunged in the hot-bed, being duly watered and shaded.

The third sort, or the Cassava, according to Martyn, "thrives best in the West Indies, in a free mixed soil where it is propagated by the bud or gem, in the following manner: The ground is first cleared, and hoed up into shallow holes, of about ten or twelve inches square, and seldom above three or four inches in depth. When they intend to plant, they provide a sufficient number of full-grown stems, and cut them into junks, of about six or seven inches length, as far as they find them tough and woody, and well furnished with prominent, well-grown, hardy buds: of these they lay one or two in every hole, and cover them over with mould from the adjoining bank; but care must be taken to keep the ground clean, until the plants rise to a sufficient height to cover the mould, and to prevent the growth of all weaker weeds."

This root, though of a poisonous quality, serves for bread to the inhabitants of the West Indies, when divested of this property, which is done by rubbing the root forcibly upon a strong copper grater, till reduced to a rough saw-dust-like powder, or meal: it is then put into a press to squeeze out the poisonous juice; and, being sufficiently pressed and sifted, is made into bread, by spreading it two or three inches thick, upon an iron plate heated over the fire; and thus the parts join, incorporate, and become cake bread, which is accounted very nourishing.

They all require to be sparingly watered in the winter season, to prevent their rotting; and to be kept constantly in the stove, where they afford variety, and a fine appearance in their large foliage and flowers.

IBERIS, a genus containing plants of the herbaceous, annual, perennial, and undershrubby kinds.

It belongs to the class and order *Tetradynamia Siliculosa*, and ranks in the natural order of *Siliquosæ*, or *Cruciformes*.

The characters are: that the calyx is a four-leaved perianthium: leaflets obovate, concave, spreading, small, equal, deciduous: the corolla is four-petalled, unequal: petals obovate, obtuse, spreading: claws oblong, upright: of these the two exterior petals are far larger, and equal to each other: the two interior very small, reflex: the stamina have six awl-shaped filaments, upright: of which the two lateral ones are shorter: anthers roundish: the pistillum is a roundish, compressed germ: style simple, short: stigma obtuse: the pericarpium is an upright, suborbiculate, compressed silicle, emarginate, surrounded by a sharp edge, two-celled: partition lanceolate: valves navicular, compressed, carinated: the seeds a few, and subovate.

The species are: 1. *I. umbellata*, Purple Candy-tuft; 2. *I. amara*, White Candy-tuft; 3. *I. linifolia*, Flax-leaved Candy-tuft; 4. *I. odorata*, Sweet-scented Candy-tuft; 5. *I. rotundifolia*, Round-leaved Candy-tuft; 6. *I. semperflorens*, Broad-leaved Evergreen Candy-tuft; 7. *I. sempervirens*, Narrow-leaved Evergreen Candy-tuft; 8. *I. Gibraltarica*, Gibraltar Candy-tuft.

The first has an annual root, white, oblong, fusiform: the stem upright, leafy, half a foot, or from a span to a foot in height, subangular, green, smooth, branching: the leaves are frequent, alternate, lanceolate, acuminate, smooth: the flowers in a hemispherical corymb, on peduncles half an inch in length, of a pale purple colour. It is a native of the south of Europe, flowering in June and July.

There are varieties with bright purple flowers, and with white flowers.

The second species resembles the first very much, but is smaller: the stem is seven or eight inches high, pubescent, somewhat rugged, branched: branches diffused, alternate, the lower ones sometimes opposite, not rising all to the same height: the leaves are alternate, oblanceolate, or linear-lanceolate, blunt, sessile, decurrent, bright green, thickish, smooth, the lower ones serrate, the rest toothletted, especially in front, or with a tooth or two on each side: the flowers white, in a terminating spike-like raceme; or rather, in a corymb lengthened into a raceme as the inflorescence advances. It is a native of Switzerland, &c.

The third has a simple, white, twisted root, having few fibres: the root-leaves lanceolate-linear, serrate, withering and falling as the stem advances: stem-leaves linear, quite entire, sessile, few, gradually shorter, sharpish: the stem herbaceous, straight, slender, branched at top: branches mostly bifid: the flowers of a purple colour, in corymbs, the outer ones peduncled,

with the two other petals larger. It is a native of Spain, &c. and is annual, flowering in July.

The fourth species seldom grows so large as the first, and the flowers are much smaller, but have an agreeable odour. They are in close corymbs and are of a snowy whiteness. It is a native of Geneva.

The fifth has a creeping stem: the leaves are smooth, soft; those next the root quite entire and petioled, those on the stem smooth and entire: the flowers are reddish purple, almost regular, in racemes, on spreading peduncles. It is a native of Switzerland, flowering from May to July.

The sixth species is a low shrubby plant, which seldom rises above a foot and half high, having many slender branches, which spread on every side, and fall towards the ground if they are not supported. These branches are well furnished towards their extremity with leaves, which continue green all the year; and in summer the flowers are produced at the end of the the shoots, are white, and grow in an umbel, continue long in beauty, and, being succeeded by others, the plants are rarely destitute of them from the end of August to the beginning of June. It is a native of Persia, &c.

There is a variety with white striped leaves.

The seventh is of humbler growth than the sixth, seldom rising more than six or eight inches high, the branches rather herbaceous: the leaves continue green through the year, and the flowers are of as long duration as those of the sixth species. It is a native of the Island of Candia, flowering from April to June.

In the eighth species the stems are many, thick, green, striated, ascending from a foot to eighteen inches in length, divided into several branches: the leaves alternate, gradually widening from a narrow base, ending in a blunt point, thick, smooth, veinless except in the middle, dark green above, somewhat paler underneath: the flowers terminating in corymbs, at first white, afterwards pale purple, without scent. It is a native of Spain, flowering early in the spring.

The stems are ridged and woody, and the leaves larger and less bluntly toothed in the cultivated plant. The flowers are also twice as large.

Culture.—The four first annual sorts must be raised annually from seed, by sowing it at different times in the spring, in patches, in the fronts of borders, clumps, and other parts of pleasure-grounds, where the plants are to flower, thinning them properly afterwards.

The fifth sort may be raised by planting the root off-sets and cuttings as below.

The three shrubby perennial sorts may be increased by slips and cuttings, which should be planted out in pots, plunging them in a moderate hot-bed, or in a warm shaded border in the later spring and early summer months, water being occasionally given. When well rooted in the autumn, they should be removed into pots, being protected in the winter season in the green-house.

The first sorts are very ornamental in the open ground, when properly varied. And the latter in green-house, and other potted collections. A few of them may likewise be set out in the warm shrubbery borders.

IBISCUS. See Hibiscus.

ICACO. See Chrysobalanus.

ICE-HOUSE, a sort of building sunk in the ground for the purpose of preserving Ice in for use in the summer season.

The proper situation for an Ice-House, is that of a dry spot of ground; as wherever there is moisture, the Ice will be liable to dissolve: of course in all strong soils, which retain the wet, too much care cannot be taken to make drains all round the houses to carry off moisture; as when this is lodged near them, it will occasion a damp, which is always prejudicial to the keeping of Ice.

The places should likewise be elvated, that there may be descent enough to convey off any wet that may happen near them, or from the Ice melting; and also, as much exposed to the sun and air as possible; not under the drip, or in the shade of trees, as is too often the practice, under the supposition, that if exposed to the sun, the Ice will melt away in summer, which never can be the case where there is sufficient care taken to exclude the external air, as the heat of the sun can never penetrate through the double arches of the buildings, so as to add any warmth to the internal air; while, when entirely open to the sun and wind, all damps and vapours are readily removed.

The form of the building may be according to the fancy of the owner; but for the well into which the Ice is put, a circular form is the most convenient; the depth and diameter of it being proportioned to the quantity of Ice wanted; but it is always best to have sufficient room, as when the house is well built, it will keep the Ice two or three years: and there will be this advantage in having it large enough to contain Ice for two years consumption, that, if a mild winter should happen, when there is not Ice to be had, there will be a stock to supply the want in the House.

Where the quantity wanted is not great, a well of six feet diameter, and eight feet deep, will be large enough; but for a large consump-

tion, it should not be less than nine or ten feet diameter, and as many deep: where the situation is either of a dry chalky, gravelly, or sandy kind, the pit may be made entirely below the surface of the ground; but in strong loamy, clayey, or moist ground, it will be better to raise it so high above the surface, as that there may be no danger from the wetness of the soil.

At the bottom of the well there should be a space about two feet deep left, for receiving any moisture which may drain from the Ice, and a small underground drain should be laid from this, to carry off the wet; over this space should be placed a strong grate of wood, to let the moisture fall down, which may at any time happen, from the melting of the Ice. The sides of the well must be walled up with brick or stone at least two feet thick; but if it be thicker it will be better, as the thicker the walls are made, the less danger there is of the well being affected by external causes. When the wall of the well is brought within three feet of the surface, there must be another outer arch or wall begun, which must be carried up to the height of the top of the intended arch of the well; and if there be a second arch turned over from this, it will add to the goodness of the House; but this must depend on the person who builds going to the expense. When not, the plate into which the roof is to be framed must be laid on this outer wall, which should be carried high enough above the inner arch to admit of a door-way in, to get out the ice. Where the building is to be covered with slate or tiles, there should be a thickness of reeds, straw, or other similar material laid under, to guard against the effects of the sun and external air; where they are laid two feet thick, and plastered over with lime and hair, there will be no danger of the heat penetrating.

The external wall of the house need not be built circular, but of any other form, as square, hexangular, or octangular; and where it stands much in sight, may be so contrived as to make it a pleasing object.

Ice-Houses may be built in such a manner as to have alcove seats in the front, having passages to get out and put in the Ice behind them; or the entrance may be behind, to the north; small passages being left next the seats, through which to enter to take out the Ice, a large door being contrived with a porch wide enough for a small cart to back in, to shoot down the ice upon the floor near the mouth of the well, where it may be well broken before it is put down. The aperture of this mouth of the well need not be more than two feet and a half in diameter, which will be large enough to put down the ice, a stone being left to stop it, which must be closed up as securely as possible after the ice is put in, and all the vacant space above and between this and the outer door be filled close with barley straw, or other similar material, to exclude the external air.

The door to enter for taking out the ice should be no larger than is absolutely necessary for the coming at the ice, and must be strong and close to exclude the air; and at five or six feet distance from this another door should be contrived, which should be closely shut before the inner door is opened, whenever the ice is taken out of the House.

When the House is thus finished, it should have time to dry before the Ice is put into it; as when the walls are green, the damp of them frequently dissolves the Ice. And, at the bottom of the well, upon the wooden grate, some small faggots should be laid; and if upon these a layer of reeds be placed smooth for the Ice to rest upon, it will be better than straw, which is commonly used. In the choice of the Ice, the thinner it is the better it may be broken to powder; as the smaller it is broken the better it will unite when put into the well. In putting it in, it should be rammed close, and a space left between it and the wall of the well, by straw being placed for the purpose, so as to give passage to any moisture that may be collected by the dissolving of the Ice on the top or otherways.

In putting the Ice into the House, some mix a little nitre with it, to make it congeal more fully; but this is not necessary.

As the Ice becomes solid in the well, an iron crow is necessary to take it up with.

The Ice-House is, as has been seen, capable of being made an ornamental building; but this is seldom done; it being generally placed in a sequestered spot, on the side of a hill or sloping ground, the base of which is lower than the bottom of the well; the outside being well banked up with earth, to keep out all external air and heat, and neatly covered with turf.

In the annexed plate is the plan of an improved Ice-House.

Fig. 1. is a section in the direction of the entrance passage.

A. Upper covering of earth.

B. and K. Strata of clay.

C. Wall of the arched roof of passage.

D. Entrance passage.

E. Entrance aperture of the well.

F. Well.

G. Side-walls of well, and the cavities of it for the retention of the warm air, which would otherwise make its way to the well.

H. Pipe for carrying off the water or moisture.

I. Drain of it.

L. Door of passage.

Fig. 2. Plan of the well on the level of the passage floor.

Fig. 3. Ground plan of the well.

Fig. 4. Front elevation of the entrance.

N. B. In figures 2, 3, and 4, the letters of reference are placed to the same parts of the building respectively, as in fig. 1.

ICE-PLANT. See MESEMBRYANTHEMUM.

JERUSALEM ARTICHOKE. See HELIANTHUS.

JERUSALEM SAGE. See PHLOMIS.

ILEX, a genus containing plants of the hardy evergreen tree or shrubby kinds.

It belongs to the class and order *Tetrandria Tetragynia* (*Polygamia Dioecia*), and ranks in the natural order of *Dumosæ*.

The characters are: that the calyx is a four-toothed perianthium, very small, and permanent: the corolla one-petalled, four-parted, wheel-shaped: divisions roundish, spreading, rather large, with cohering claws: the stamina have four awl-shaped filaments, shorter than the corolla: anthers small: the pistillum is a roundish germ: style none: stigmas four, obtuse: the pericarpium is a roundish berry, four-celled: the seed solitary, bony, oblong, obtuse, gibbose on one side, cornered on the other.

The species cultivated are: 1. *I. aquifolium*, Common Holly; 2. *I. Cassine*, Dahoon Holly; 3. *I. vomitoria*, South-sea Tea, or Evergreen Cassine.

The first rises from twenty to thirty feet, and sometimes more; but its ordinary height is not above twenty-five feet. The trunk is covered with a grayish smooth bark, and those trees which are not lopped or browzed by cattle, are commonly furnished with branches the greatest part of their length, and form a sort of cone: the leaves are petioled, about three inches long, and one and a half broad, of a lucid green on their upper surface, and pale on their under, having a strong midrib; the edges are indented and waved, with sharp stiff thorns terminating each of the points, some raised upwards, others bent downwards, being fixed into a strong woody border, which surrounds the leaf. When this tree grows naturally, it has flat, entire leaves, without thorns, only ending in a sharp point, mixed with the others, especially as it advances in age: the flowers in clusters from the base of the petioles (from a sort of scale upon the branch) on very short peduncles, each sustaining five, six, or more flowers (generally three together), appearing in May. They are succeeded by roundish berries (crowned with the calyx, which turns black), turning to a beautiful scarlet about Michaelmas, and continuing the greatest part of the winter.

There are a great many varieties of both the green-leaved and variegated sorts. Of the first the Common Green-leaved Prickly, the Smooth Green-leaved, the Narrow Serrated Green-leaved, the Green-leaved Yellow-berried, the Box-leaved Green, the Hedgehog Green; and of the latter, the Common Prickly, with Silver-striped Leaves, with Gold-striped Leaves, with Blotched Leaves, the Smooth with White-striped Leaves, with Yellow-striped Leaves, with Blotched Leaves, with Narrow-striped Leaves, the Blotched Yellow berried, the Cream-coloured, the Copper-coloured, the White-leaved, the Mottled-edged, the Hedgehog Silver-edged, the Gold-edged Hedge-hog, the White Blotched Hedgehog, the Yellow Blotched Hedgehog, the Painted Lady variegated.

The second species rises with an upright branching stem to the height of eighteen or twenty feet; the bark of the old stems is of a brown colour, but that of the younger stems or branches green and smooth: the leaves more than four inches long, and one and a quarter broad in the broadest part, of a light green and thick consistence; the upper part is serrate, each serrature ending in a small sharp spine; they stand alternately on every side of the branches, on very short foot-stalks: the flowers come out in thick clusters from the side of the stalks; they are white, and shaped like those of the first, but smaller. Both the female and hermaphrodite flowers are succeeded by small roundish berries, making a fine appearance in winter; but they have not yet produced fruit in this climate. It is a native of Florida and Carolina.

There are varieties, as with broad leaves, and with narrow leaves, with scarcely any serratures.

The third rises to the height of ten or twelve feet, sending out branches from the ground upwards, which form themselves into a sort of pyramid: the leaves are about the size, shape, texture, and colour of the small-leaved alaternus, but somewhat shorter, and a little broader at the base: the flowers are produced in close whorls at the joints of the branches, near the foot-stalks of the leaves: they are white, and are succeeded by bright red berries, which continue upon the plants most part of the winter, and make a fine appearance, intermixed with the green leaves. It is a native of West Florida.

Culture.—These plants are all capable of being increased from seeds, and by the operations of budding and grafting.

The seeds or berries should be sown as soon as they are perfectly ripened, in small beds prepared for the purpose. But as they are long in germinating, it is the practice with some to deposit them for a year before they are sown in

the beds, in pots filled with earth or sand, or in a hole in the earth, in a dry situation; the first is probably the best method.

The plants mostly rise in the second spring, when they should be kept well weeded and watered.

After they have had two years' growth in these beds, they should be removed, and planted out in nursery rows at the distance of two feet, and one apart in the rows. They should remain in these till of proper size to be planted where they are to remain, keeping them perfectly clean, and the ground occasionally stirred about them.

The proper seasons for removing them are either the early autumn or spring; the former in dry grounds, and the latter in those that are of a retentive nature.

In the second sort the seeds, after being prepared as above, should be sown in pots, and plunged the second spring in a gentle hot-bed, in order to bring up the plants. They should then be kept in the pots, and have protection in the winter season till they have become of hardy growth, when they may be turned out, and planted in warm situations. They afterwards require protection in very severe winters.

The third sort may be managed in the same way as the second, the young plants being gradually inured to the open air, having only the morning sun at first. They should be kept in the pots four or five years, as they grow slowly, being well protected in the winter. They all succeed best in a dry soil.

All the varieties of the different sorts are to be continued either by budding or grafting upon stocks of the first sort. The first should be performed in the latter part of the summer, and the latter in the early spring, upon stocks of two years' growth. See BUDDING and GRAFTING.

All the sorts and varieties are highly ornamental in the clumps, borders, and other parts of pleasure-grounds, affording much variety when judiciously intermixed. The first sort frequently rises to a large tree, having a fine white hard wood, useful for various purposes. The bark also affords the substance called *birdlime*, which is prepared by boiling it till the green part is capable of being separated from the white, then laying it in a cool cellar for a few days, afterwards pounding it till it becomes a tough paste, washing it repeatedly, till it becomes quite clear, then placing it in an earthen vessel to ferment or become fine, when it will be fit for use.

ILLECEBRUM, a genus containing plants of the herbaceous, flowery, biennial, and shrubby perennial kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Holoraceæ*.

The characters are: that the calyx is a five-leaved cartilaginous perianthium, five-cornered, with coloured leaflets, which are sharp, with distant points, permanent: there is no corolla: the stamina have five capillary filaments, within the calyx: anthers simple: the pistillum is an ovate germ, sharp, ending in a short bifid style: stigma simple, obtuse: the pericarpium is a roundish acuminate capsule, both ways five-valved, one-celled, covered by the calyx: the seed single, roundish, sharp on both sides, very large.

The species cultivated are: 1. *I. lanatum*, Woolly Illecebrum; 2. *I. suffruticosum*, Shrubby Illecebrum, or Knot-grass; 3. *I. Paronychia*, Mountain Illecebrum, or Knot-grass.

The first has a rigid round stem, somewhat hairy, branched only at the base: the leaves are lanceolate, ovate, subsessile, opposite, petioled, quite entire, sharpish, naked, pubescent underneath: (spikes close, oblong, and axillary:) the peduncles lateral, very short, in three or four sessile spikes, unequal to the leaflet: stamens connected at the base by means of a five-toothed crown: the seed kidney-form. It is a native of the East Indies, biennial, and flowering most part of the year.

It varies in size. This is the smaller one. The Great Woolly Illecebrum has solitary, not aggregate spikes. And, according to Retzius, there is a remarkable variety with round leaves, in Malabar.

The second species has woody stems about a foot high, with small leaves like those of Knot-grass: the flowers come out singly on the side of the stems, and make no great appearance. It is a native of the south of Europe, flowering from May to August.

The third has trailing stalks near two feet long, with leaves like those of the second kind; the heads of flowers come out from the joints of the stalk, having neat silvery bractes surrounding them, which make a pretty appearance: the flowers appear in June, and there is generally a succession of them for at least two months. It is perennial, and a native of the south of Europe.

Culture.—The first sort may be increased by sowing the seeds in pots of light mould, in the spring, in the same manner as the amaranthus, plunging them in a mild hot-bed. And if they be afterwards plunged in the tan-bed in the stove, these branches will often put out roots by which they may be raised.

Cuttings of the branches managed in the same way will sometimes grow.

The two last sorts may be propagated by seeds and cuttings.

The former should be sown in the spring, as about April, in pots, or on a bed of light earth. When the plants have attained some growth, they should be taken up carefully with earth about their roots, and placed, some in pots, and the others in a dry warm border, due water and shade being given; those in pots being protected by a frame and glasses in the winter, and those in the open ground screened in severe frosts, by mats or other means, and kept perfectly clean.

They may also be increased by planting cuttings of the branches, in the summer months, as about June, in pots or a shady border. When they have taken good root, they may be removed to the places where they are to grow, or into other pots, moist weather being chosen for the purpose.

The first sort affords variety in the stove or green-house collections; and the latter in the borders, and among potted plants of the more hardy kinds.

IMMORTAL FLOWER. See GNAPHALIUM.

IMPATIENS, a genus containing plants of the flowery annual kind.

It belongs to the class and order *Syngenesia Monogamia*, and ranks in the natural order of *Corydales*.

The characters are: that the calyx is a two-leaved perianthium, very small: leaflets roundish-acuminate, equal, placed towards the sides of the flower, coloured, deciduous: the corolla is five-petalled, ringent: petals unequal; of which the superior is roundish, flat, upright, slightly trifid, constituting the upper lip: lower pair reflex, very large, outwardly larger, obtuse, irregular, constituting the lower lip: intermediate pair opposite, rising from the base of the upper petal: nectary one-leafed, receiving in the manner of a hood the base of the flower, oblique at the mouth, rising outwardly, ending in a horn at the base: the stamina have five filaments, very short, narrower towards the base, incurved: anthers as many, connate, divided at the base: the pistillum is a superior germ, ovate-acuminate: style none: stigma simple, shorter than the anthers: the pericarpium is a one-celled capsule, five-valved, springing open elastically, the valves rolling spirally: the seeds several, roundish, fixed to a columnar receptacle.

The species cultivated are: 1. *I. Balsamina*, Garden Balsam; 2. *I. Noli me tangere*, Common Yellow Balsam.

The first is an annual plant, rising a foot and half high, and dividing into many succulent branches: the leaves long and serrate: the flowers come out from the joints of the stem, upon slender peduncles about an inch long, each sustaining a single flower; but there are two, three, or four of these peduncles arising from the same joint: the flowers red or white. It is much increased in size by cultivation; and is a native of the East Indies, &c.

There are varieties with single and double red flowers, with single and double scarlet flowers, with single and double white flowers, with single and double purple flowers, with variegated single and double flowers, with large double variegated scarlet and white flowers, with large double variegated purple and white flowers, with double red and purple flowers, and with large double bizarre flowers.

The second species has an annual root: the stem a foot high, upright: stem and branches pale yellowish green, smooth and shining, somewhat transparent, thickest at the joints, succulent and brittle: the branches sometimes opposite: the lower leaves ovate, uppermost elliptical or lanceolate, irregularly serrate, all smooth, petioled: the upper part of the stem flexuose, forming an obtuse angle opposite to each leaf: some of the branchings of the peduncles have bractes, and some not: the flowers yellow; the lateral petals spotted with red, by cultivation changing to pale yellow or purplish; these are blunt, slightly two-lobed, with an oval appendix at the base, about an inch in length, and above half an inch in breadth. It is a native of Europe.

When the seeds are ripe, upon touching the capsule they are thrown out with force; hence the name.

Culture.—These beautiful plants are all capable of being increased by sowing the well-ripened seeds of the best varieties annually, in the spring, in the first sort, in pots filled with light, dry, good earth, or in the mould of the bed, plunging them in the former case in the hot-bed; or in the natural ground, in the borders, in a warm dry situation, covering them with glasses; but the two former are the best methods. When the plants are up, they must have air admitted freely every day when fine, and occasional moderate waterings. After they have attained a few inches in growth, they should be carefully removed into separate pots, with balls of earth to their roots, being replunged in the hot-bed, or be pricked out on a fresh hot-bed. Those in the natural ground should be kept properly thinned, and be removed into pots, or the situations where they are to flower, about the end of June, with balls of earth, as in the others.

It is a practice with some to remove those in pots and on hot-beds a second time in about a

month; but they grow stronger where this is avoided, by placing them at first in larger pots, and thinner in the bed, so as to have full room to rise to a proper size. The frames should be raised as the plants advance in growth.

About the beginning of June they should be gradually exposed to the influence of the full air, in order to harden them, that they may be set out towards the end of it; when they should have sticks placed for their support, to which they should be neatly tied. The potted plants should likewise be often refreshed with water, once or more in the day, when the season is hot. Those in the open ground should also be occasionally watered in dry weather. See ANNUAL PLANTS.

All these plants may be raised with great facility in the stove, in the same manner as above.

In the second species the seed may be sown either early in the spring, or in the autumn. In both the species those in the natural ground should be sown later than in the hot-bed method.

In order to save seed, a few of the best plants, of the different finest varieties, should be placed, when in full blow, in some airy situation, so as to be exposed to the sun, and at the same time protected from wet by glasses.

The fine potted species and varieties of these plants are highly ornamental among other potted plants, in the most conspicuous places about the houses; and the less valuable kinds in the fronts of the borders, clumps, and other parts of pleasure-grounds, in mixture with other flowery plants.

INARCH-GRAFTING. See GRAFTING.

INARCHING, a method of grafting by which the parts of different trees are bent down and united, while the trees remain growing. See GRAFTING.

INDIAN ARROW-ROOT. See MARANTA.

INDIAN CORN. See ZEA.

INDIAN CRESS. See TROPÆOLUM.

INDIAN FIG. See CACTUS.

INDIAN GOD TREE. See FICUS.

INDIAN MALLOW. See SIDA.

INDIAN OAK. See TECTONA.

INDIAN REED. See CANNA.

INDIAN SHOT. See CANNA.

INDIGO. See INDIGOFERA.

INDIGO, BASTARD. See AMORPHA.

INDIGOFERA, a genus containing plants of the shrubby exotic kind.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leafed perianthium, spreading, nearly flat, five-toothed: the corolla papilionaceous: standard rounded, reflex, emarginate, spreading: wings oblong, obtuse, spreading at the inferior margin, of the shape of the standard: keel obtuse, spreading, deflex, marked on each side by an awl-shaped hollow dagger or point: the stamina have diadelphous filaments, disposed in a cylinder, ascending at their tips: anthers roundish: the pistillum is a cylindric germ: style short, ascending: stigma obtuse: the pericarpium is a roundish long legume (linear-oblong, commonly four-cornered): the seeds some, kidney-shaped (kidney-retuse or cuboid).

The species cultivated are: 1. *I. tinctoria*, Dyer's Indigo; 2. *I. argentea*, Silvery-leaved Indigo; 3. *I. candicans*, White Indigo; 4. *I. amœna*, Scarlet-flowered Indigo.

The first has the stem filiform, subflexuose, angular, smooth, upright, a foot and half high, a little branched at top: the branches like the stem, alternate, upright: the leaflets in four pairs or more, very blunt with a point, smooth, very finely villose underneath, almost equal: the racemes from the axils of the leaves, when they begin to flower, much shorter than the leaf, but becoming longer as they advance: the legumes drooping, subcolumnar, sharp, straight, very finely villose. It is a native of the East Indies.

The second species has the whole plant silky and glaucous: the stem suffruticose, upright, branched, round, from half a yard to three quarters of a yard in height, and gray: branches alternate, stiff, round, finely silky, and hoary: the leaves alternate, petioled, two-paired (seldom ternate), spreading, three inches long: leaflets opposite, subsessile (the end one larger and petioled), quite entire, bluntish, the older ones subemarginate, the midrib raised only underneath, finely silky, glaucous, spreading, flat, from twelve to fifteen lines in length, and from six to eight lines in breadth: the petioles round on one side, grooved on the other: the racemes axillary, solitary, upright, shorter than the leaves, an inch and half long: the flowers on short, alternate, reflex pedicels, and drooping. It is a native of Egypt or the West Indies.

The third is distinguished by the whiteness of the stem and the under-side of the leaves: the flowers are red, not many (five to eight or nine) in a spike. It is a native of the Cape, flowering from July to September: but its principal time of flowering, according to Mr. Curtis, is from the beginning of May to the middle of June.

The fourth is a native of the Cape, flowering in March and April.

Culture.—The first sort of these plants may

be increased by seeds, which should be sown in the spring, in pots of light fresh earth, and plunged into a mild hot-bed. When the plants have attained some growth, they should be removed into separate pots, and be replunged in the bark-bed of the stove, where they must be constantly kept.

The other sorts may be propagated by planting cuttings of the young shoots, in pots of good fresh earth, in the spring or summer, plunging them in the bark hot-bed of the stove. When they have stricken good root, they should be removed into separate pots of the same sort of mould, preserving some earth about their roots, replunging them in the hot-bed, due shade and water being given. They may afterwards be preserved in a dry stove or good green-house.

Such of the sorts as ripen seeds here may also be increased in that way.

The first is the plant from which Indigo, a material much employed in dyeing, is prepared.

This and the second kind also afford variety in stove collections; and the two others among plants of the green-house kinds.

INOCULATING, the practice of inserting the buds of trees of the same kind into their stocks.

The most proper season for this sort of work is, from the middle of June until the middle of August, according to the forwardness of the season, and the particular sorts of trees to be increased; but it may be easily known, by trying whether the buds will come off well from the wood or not. The most general rule is, when the buds are found to be formed at the extremity of the same year's shoots, which is a sign of their having finished their vernal growth. The first sort commonly inoculated is the Apricot, and the last that of the Orange-tree, which should never be done until the middle of August. In doing this sort of work, choice should be made of cloudy weather; as, when done in the middle of the day, in very hot weather, the shoots perspire so fast as to leave the buds destitute of moisture; nor should the cuttings be taken off from the trees long before they are used; but if fetched from some distance, the leaves should be cut off, but all the foot-stalks left, and then wrapped up in wet moss, and put in a tin box, to exclude the external air.

And the practice of throwing cuttings into water is improper; as it saturates the buds so with moisture, that they have no attractive force left to imbibe the sap of the stock; for want of which they very often miscarry, and disappoint the operator.

It is remarked by Mr. Forsyth, that when the Pear-trees which are grafted in the spring have not taken, he would advise the cutting them off, a little below the graft, at a joint or bud. The tree then throws out a great number of healthy shoots; all of which should be rubbed off, except so many as are sufficient to fill the wall; nailing those up, to prevent the wind from breaking them. About the latter end of July the shoots will be fit to inoculate, which should then be done, leaving a little of the wood on the inside of the bud when inserted into the stock, and rubbing in some of the composition, tying on the bass.

Having grafted some summer Bonchrêtiens with the Bergamot de Pasque (or Easter Bergamot) and Pear d'Auch, in the spring, most of which failed, he cut them off below the grafts, and in July following they had produced shoots from five to six feet long, which he inoculated in the latter end of that month with the beforementioned sorts, which all took. About the beginning of September he ordered the basses to be slackened; which being left too loose, the barks began to separate. He then made them be tightened, letting them remain till the following spring. About the beginning of April, when he saw the buds begin to shoot, he cut the shoots near to the buds; but finding many where the bark had not united, and some of the eyes apparently dead, he took a sharp penknife, and cut out all the decayed bark, rubbing in some of the composition, in the liquid state, till the hollow parts were filled up; he then smoothed it off with the finger, even with the bark of the stock. He also rubbed some of the composition over those eyes that were in the worst state, being quite black; but with very little hope of recovery. "To his great astonishment, many of those which seemed perfectly dead, recovered, and by the middle of July had shoots from five to six feet long (many of the shoots which took well having fruit-buds formed for next year), and covered a space of wall larger than a young tree would have done in eight years; all the cavities where he cut out the dead bark and applied the composition, were, in the course of the summer, filled up with sound wood, and the bark between the stocks and grafts perfectly united."

"Three years ago he inoculated some Brown Beurrés and Crasanes with Pear d'Auch, one of which now covers a wall sixteen feet high, and fifteen feet long, and has more fruit on it this year than a maiden tree would have produced twenty years after planting." But he "never recommends inoculating or grafting of old trees, except when bad sorts, or more of any sort is wanted for a supply: in that case, he would recommend to inoculate or graft with Pear

d'Auch, Colmars, and Winter Bonchrêtiens, which keep much longer than Beurrés, Crasanes, &c."

For standards that have been grafted in the spring, and have missed, he advises that they should be cut below the graft, as, when so treated, they throw out a great number of shoots, which should by no means be too soon thinned, as in that case they will be liable to be broken by the wind. The weakest shoots may be begun to be taken off about the latter end of May or beginning of June. About the middle of the latter month, they will have acquired considerable strength: then thin them; leaving as many strong regular shoots, and of those nearest the top of the stem, as will form a handsome head. If the stem be very strong it will be necessary, perhaps, to leave more than are intended to be inoculated, on purpose to receive the sap, which will flow in great abundance from a large trunk, and, without this precaution, be apt to burst the shoots. He has often seen shoots as large as his arm burst by a superabundance of sap. When that is likely to happen, the best thing is, to scarify the shoots, and rub a little of the composition into the wounds.

INSECT DISEASES, such vegetable diseases as are produced by different sorts of animals of the insect tribe. See VEGETABLE INSECT DISEASES.

The chief insects that affect plants of the fruit-tree kinds, are those of *Aphis*, *Acarus*, *Ant*, *Chermes*, *Cicada*, *Coccus*, *Earwig*, *Papilio*, *Phalæna*, and *Thrips* tribes.

Of the first sort there are a vast number of species, each tree being said to be infested by a different distinct species. Hence the author of the *Systema Vegetabilium* has denominated them from the trees on which they are found; as, the Cherry Aphis, Currant Aphis, Plum Aphis, &c. The males are few in comparison with the females, and have wings, while the latter are numerous, and without them. See PUCERON and VINE-FRETTER.

The second is a highly destructive insect in houses where forcing is practised. It is not furnished with wings, but the female is oviparous. The species, as in the former, are very numerous. It often commits great mischief on vines, peaches, nectarines, cherries, forced kidney-beans, melons, &c. See RED SPIDER.

The third, or Ant, is highly injurious to fruits, especially those of the peach kind, as they become in a state of maturity. They run all over the trees, and the best fruit is occasionally filled with them. It has been supposed by some that they are of use by devouring the Aphides on the trees; but Mr. Forsyth is of a different opinion, and we have often seen fruit much spoiled by them.

The best methods of destroying them, according to the above author, is, by making holes in the ground along the side of the wall where the fruit-trees are, by an iron crow, so that the inside surface may be quite smooth. These insects, from being disturbed, soon come to the holes, and fall into them; when, being prevented from getting up by the smoothness of the sides, they may be readily destroyed by pouring water upon them. But more effectual methods are, either by mixing quick-lime with soot, and placing it in their tracks, or putting it in their nests, and then pouring water, or urine and soap-suds, upon it, so as to slake it, confining the heat by a turf, or some earth. The heat thus produced soon destroys them. The powder of stavesacre laid round the stems of trees, is said to prevent their running up them.

The fourth, or *Chermes*, belongs to the order *Hemiptera*.

There are several species. Their specific names are taken from the different plants on which they are principally met with; as the *Chermes graminis*, or Grass Bug; *Chermes ficus*, or Fig-tree Bug, &c. The last is one of the largest of the genus, being brown above and greenish beneath, and has four long wings, placed in the form of an acute roof. The larva is of an oblong form, and has six feet, but its motion is slow. When attempted to be caught, the Chermes makes its escape rather by leaping than flying, by means of its hinder legs, which play like springs. Several of the species are provided at the extremity of their bodies with small sharp-pointed implements, but which lie concealed; and these they draw out in order to deposit their eggs, by making punctures in the plants that suit them. It is in this way that the Fir-tree Chermes produces that enormous scaly protuberance which is sometimes found at the summit of the branches, and which is formed by the extravasation of the juices occasioned by the punctures. The young larvæ shelter themselves in cells contained in the tumour. These insects are capable of being destroyed in the same manner as the Cocci tribe.

The fifth, or *Cicada*, belongs to the same order as the above.

The larvæ of many of this tribe void large quantities of frothy matter upon the leaves and branches of the plants and trees, in the midst of which they are always concealed, probably for protection, and to be shaded from the sun's influence. These insects should be destroyed, as the froth is unpleasant, and the leaves of the trees are often devoured, by rubbing off the

larvæ with the hand, and afterwards watering the trees well with soft water, such as that of ponds.

The sixth, or *Coccus*, also belongs to the same order, and the males have wings, but the females none.

The sorts most commonly met with, when full grown, have somewhat the form of a boat, with the keel uppermost, being apparently without feet, eyes, &c. while in this state resembling some sorts of galls or excrescences of the bark of trees.

Mr. Forsyth observes, that "a thin film of a white cotton-like substance is interposed between the flat part of the body and the tree. This is common, in a greater or lesser quantity, to all the species, and appears at first all round the edge as a kind of cement, to join it to the tree. The males are very few in proportion to the females, and not nearly one-fourth of their size; they are beautiful little flies, which, after a short but active life, terminate their existence without having tasted food, being provided with no sort of organs for that purpose."

"The Peach, Nectarine, and Pear Trees are very much infested with these insects: they frequently cut through the bark, and the trees then appear as if they had been scratched by cats." He has "seen some with this appearance all over them."

He advises, that "when these insects first appear on the bark, they should be scraped off with a wooden knife, and the stem and branches of the tree well washed with soap-suds and urine, applied with a stiff painter's brush. This should be done in February, before the buds begin to come out. But if the outer bark is perforated, it must be cut or pared off with a long knife; and if you find any brown spots in the inner bark, they must be carefully cut out. This disease is, he thinks, one great cause of the canker, and of the death of the tree."

And it is added, that "when this disease has made its way through both barks, as is often the case, the branches on each side of the tree may be cut close to the stem, if it has an upright one; but if the tree be trained fan-fashion, the best way is to head it near to the place where it was grafted."

He has "headed old Pear-trees which were so dead, except a small strip of live bark on one side, that you might rub the bark off them as easily as off a bundle of faggot-sticks that had been cut upwards of a year; yet these trees have shot out fresh branches to the length of seventeen feet in two years, and produced fine fruit the second year." It is advised to apply the composition immediately after heading, or cutting, or paring off the diseased bark.

It is further remarked, that "a very destructive species of the Coccus tribe has lately done incredible damage to the Apple-trees in the nurseries and gardens in the neighbourhood of London. Some nurserymen have lost several thousand Apple-trees in one year. These insects attach themselves to the bark by their suckers, and, by feeding on the juices of the tree, rob it of its nourishment. Such trees as are infested with them have a sickly appearance. These insects generally make their nests where branches have been cut off, or in hollow places, where the canker has eaten holes in the trees. Their first appearance is like a white down; on touching or rubbing them, they tinge the fingers of a crimson colour, like cochineal. If suffered to remain long on trees, they take wing, like Aphides."

The method that he has followed for these ten years to destroy them, is, to "rub the places where their nests are with an old brush, such as painters use, till they are all cleaned off; and if the part be canker-eaten, to cut it clean out with a knife or chisel: he then takes of soap-suds and urine equal parts, and with this he washes the wound and the bark all round it; and with a brush applies the composition, mixed with wood-ashes and the powder of burnt bones, covering the wound all over with it. Afterwards he shakes some of the powder of wood-ashes and burnt bones, mixed with an eighth part of unslaked lime finely powdered and sifted, over the hollows, or where knobs have been cut off."

And he advises, that "at the same time that the trees are cleared of the cocci the caterpillars should be picked off."

He adds, that "the first time that he observed the new coccus which has done so much mischief to the Apple-trees about London, was in a garden of his own at Chelsea, about the year 1782 or 3; and, as far as he can learn, they were imported, among some Apple-trees, by the late Mr. Swinton, of Sloane-street. Mr. Swinton afterwards removed his nursery to the King's Road, near Chelsea College, which now goes by the name of the Foreign Nursery."

Train oil has been tried, laid on with a painter's brush, but without effect.

The seventh, or *Earwig*, is often very destructive to fruit, particularly that of the Peach kind. The method recommended by Mr. Forsyth for destroying them, and which he has long pursued with success, is, to "take old bean-stalks, and cut them about nine inches long, tying them up in small bundles with some pack-thread, or with small yellow willows, and hanging them on nails against the wall, at different parts of the trees. The first thing in the morning, be-

ing provided with a board about eighteen inches square, and a small wooden trowel, take down the bundles of bean-stalks, one by one, strike them against the board, and with your trowel kill the Earwigs as they fall out of the stalks. If you follow this up every morning (or every other morning) you wtll be able to keep them under."

This method answers for any sort of trees infested with Earwigs. In some years he has "seen a great part of the fruit, especially the smooth-skinned sorts, destroyed by these insects, and a small green caterpillar; and in a scarce year of fruit, the leaves of peaches are frequently destroyed by them." It is advised, that "the shreds taken from trees that have been unnailed in autumn, should be soaked in boiling hot soap-suds for three or four days, previous to their being used again; as this will kill the eggs of Earwigs and other insects that may be deposited on them."

The eighth, *Papilio*, or Butterfly, belongs to the order *Lepidoptera*.

There are a great many species of this genus, mostly distinguished by the colour of their wings. The more common sorts, with their caterpillars, are well known.

Mr. Forsyth advises, that the caterpillars and chrysalids should be carefully picked off, and the trees be well watered with clear lime-water and tobacco-water mixed.

The ninth, *Phalæna*, or Moth kind, are extremely numerous, their caterpillars differing much in size, shape and colour. After casting their slough several times, all of them spin their cod, in which they are transformed to chrysalids. In this state they are often found rolled up in the leaves of fruit-trees, especially those of the pear, plum, and cherry kind. See PHALÆNA.

Of the *Sphinx*, or Hawk Moth kind, there are a vast number of species. Their caterpillars apply the hinder part of their bodies to the branches of trees, holding the rest erect; hence the name. In general they spin their cod under ground.

They appear early in the morning, or after sun-set, flying heavily, and making a sort of noise. Several of the caterpillars are green, and some brown, yellow, spotted, or belted. See PHALÆNA.

The *Phalæna nustria*, or Lackey Moth, deposits its eggs in rings or circles round the branches of fruit-trees, having the appearance of a necklace. See PHALÆNA.

The tenth, or *Thrips*, belongs to the order *Hemiptera*; and there are several species. It is extremely small, so as scarcely to be discovered. It produces much mischief on fruit-trees, devouring the fruit as well as the leaves. It may be destroyed in the same manner as the Cocci.

The pernicious effects of these different insects, as well as the means of removing them, will be more fully explained in speaking of those vegetable diseases that are caused by the attacks of insects. See VEGETABLE INSECT DISEASES.

INULA, a genus comprehending plants of the herbaceous and shrubby kind.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common imbricated: leaflets lax, spreading; the exterior ones larger, of equal length: the corolla compound, radiated, broad: corollules hermaphrodite, equal, very numerous in the disk: females strap-shaped, numerous, crowded, in the ray: proper of the hermaphrodite, funnel-form: border five-cleft, rather upright: female strap-shaped, linear, perfectly entire: the stamina in the hermaphrodite have five filaments, filiform, short: anther cylindric, composed of five smaller linear conjoined ones; each ending below in two straight bristles of the length of the filaments: the pistillum in the hermaphrodite is an oblong germ: style filiform, length of the stamens: stigma bifid, rather upright: in the females, germ long: style filiform, half bifid: stigmas erect: there is no pericarpium: the calyx unchanged: the seeds in the hermaphrodites solitary, linear, four-cornered: pappus capillary, length of the seeds: in the females like the hermaphrodites: the receptacle naked, flat.

The species cultivated are: 1. *I. Helenium*, Common Inula, or Elecampane; 2. *I. Britannica*, Creeping-rooted Inula; 3. *I. salicina*, Willow-leaved Inula; 4. *I. Canariensis*, Canary Inula; 5. *I. satureioides*, Savory-leaved Inula; 6. *I. fruticosa*, Shrubby Inula.

The first has a perennial, thick, fusiform, brown, branching, aromatic root; according to some, biennial: it is one of the largest herbaceous plants, being from three to five or six feet high, with the stem striated and downy, branched towards the top: the lower leaves on foot-stalks, lanceolate, a foot long, and four inches broad in the middle; upper embracing, ovate-lanceolate, wrinkled, serrated or toothed, deep green, and slightly hairy above, whitish green and thickly downy beneath: the flowering heads very large, single, terminating the stem and branches. It is a native of Japan, &c. flowering in June and July.

The second species has a perennial root: the stem near two feet high, dividing in the upper part into two or three upright branches or pe-

duncles, each sustaining one pretty large flower, of a deep yellow colour. These are in beauty in July, but seldom ripen seeds in this climate. It is a native of Germany, &c.

The third has a perennial root, aromatic, subastringent, smelling like cinnamon: the stem from a foot to two, and even three feet in height, upright, smooth, hard, firm, tinged with red, grooved or angular towards the top, where it is usually branched: the leaves alternate, sessile, or half embracing, stiff, smooth, of a dark shining green, very slightly cut, and somewhat rugged about the edge: the flowers terminating, on alternate, one-flowered, grooved, reddish peduncles, forming altogether a corymb: the calycine scales in two rows, smooth, brown, lanceolate, curved back a little at the end: the flower an inch in diameter. It is a native of Germany, &c.

The fourth rises with several shrubby stalks near four feet high, which divide into smaller branches: the leaves in clusters, narrow, fleshy, divided into three segments at their points: the flowers come out on the side of the branches at the top of the stalks; they are small, and of a pale yellow colour, appearing in August. It is a native of the Canary islands.

The fifth rises with a shrubby stalk about two feet high, dividing into many smaller branches, which are hairy: the leaves narrow, stiff, sessile; from the edges of these arise long hairs, which are stiff, and come out by pairs; at the end of the branches arise naked peduncles, four or five inches long, sustaining one small, yellow, radiated flower. It is a native of Vera Cruz.

The sixth has a stem ten or twelve feet high, divided into several woody branches: the leaves five inches long, and one inch and a half broad in the middle, smooth on the upper side, but on their under having three longitudinal veins: the flowers are produced at the end of the branches, having very large scaly calyxes; they are as large as a small Sun-flower, of a pale yellow colour. It is a native of Carthagena in New Spain.

Other species may be cultivated.

Culture.—The first sort may be propagated by seeds sown in autumn soon after they are ripe, on a warm, loamy, rather moist border. The plants should be transplanted to the places where they are to grow in the following autumn.

But the common practice is to increase it by offsets, which, when taken from the old roots carefully, with a bud or eye to each, take root easily: the best season is the autumn, as soon as the leaves begin to decay; planting them in rows about a foot asunder, and nine or ten inches distance in the rows. The following spring the ground should be kept clean from weeds, and be slightly dug over in the autumn following. The roots will be fit for use after two years growth, but will abide many years if permitted to stand.

The two following sorts may be increased by parting the roots, and planting them in the autumn, in the borders or other places where they are to remain. They should not be removed oftener than every three years.

The fourth and fifth sorts may be raised by planting cuttings of the branches, in the summer season, in pots of light earth, in shady borders. They must be removed into shelter in autumn, but should have as much free air as possible at all times, when the weather is mild. In cold weather the first should have but very little water, as, the stalks and leaves being succulent, they are very apt to rot. In summer they should be placed abroad with other hardy exotic plants, in a sheltered situation.

The last sort is propagated by seeds procured from where it grows naturally. These must be sown in pots, or upon a hot-bed, and when the plants are fit to remove, be each put into a small pot filled with light earth, and plunged into a fresh hot-bed; treating them in the same manner as other similar tender plants. It requires to be kept constantly in the stove.

The first sort may be cultivated for the medicinal use of the roots, or for ornament, in large borders.

The two following sorts may have places in the same way.

The fourth and fifth kinds afford variety among other potted green-house plants, and the last among stove plants.

IPOMŒA, a genus containing plants of the herbaceous flowery kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Campanaceæ*.

The characters are: that the calyx is a five-toothed perianthium, oblong, very small, permanent: the corolla one-petalled, funnel-form: tube subcylindric, very long: border five-cleft, spreading: divisions oblong, flat: the stamina have five awl-shaped filaments, almost the length of the corolla: anthers roundish: the pistillum is a roundish germ: style filiform, length of the corolla: stigma headed-globose: the pericarpium is a roundish capsule, three-celled: the seeds some, sub-obovate.

The species cultivated are: 1. *I. Quamoclit*, Winged-leaved Ipomœa; 2. *I. coccinea*, Scarlet-flowered Ipomœa.

The first is an annual plant, rising with two oblong pretty broad seed-leaves, which remain

a considerable time before they fall off: the stems slender, twining, and rising by support to the height of seven or eight feet; sending out several side-branches, which twine about each other and the principal stem, and about any neighbouring plants: the leaves are composed of several pairs of very fine narrow lobes, not thicker than fine sewing thread, about an inch long, of a deep green, either opposite or alternate: the flowers come out singly from the side of the stalks, on slender peduncles about an inch long: the tube of the corolla is about the same length, narrow at bottom, but gradually widening to the top; where it spreads open flat, with five angles; it is of a most beautiful scarlet colour, and makes a fine appearance. It is a native of the Indies.

The second species has a herbaceous stem, twining, quadrangular, flexuose: the leaves petioled pentangular, smooth on both sides: the peduncles very long, axillary, upright, round, two-parted-bifid, on one-flowered pedicels: the flowers long, scarlet, larger than those of the first sort: calyx five-cleft, with lanceolate segments: tube of the corolla narrower at the base, long, columnar, curved a little, and shining: border plaited, blunt: base nectareous. It is an annual plant, six or eight feet high, and a native of the West Indies.

There is a variety with orange-coloured flowers,

Culture.—These plants are increased by sowing the well ripened seed in small pots, plunging them in a mild hot-bed, or in the earth of the bed, in the early spring months, proper air and water being given. When the plants have attained some growth, and in the first sort begin to climb, they should be removed with balls of earth about their roots into the places where they are to grow, or, which is better for the first kind, into separate large pots, replunging them in the bark hot-bed. They should have proper sticks set for them to twine about, some pots of the first kind being placed in the stove, as being more tender.

The first sort affords variety in the stove, and among other tender potted plants in the summer; and the latter in the fronts of warm borders, as well as among the less tender potted flowering plants.

IRIS, a genus containing plants of the fibrous, tuberous, and bulbous-rooted flowery herbaceous perennial kinds.

It belongs to the class and order *Triandria Monogynia*, and ranks in the natural order of *Ensatæ*.

The characters are: that the calyx has bivalve spathes, separating the flowers, permanent: the corolla six-parted: petals oblong, obtuse; the three exterior ones reflex, the three interior upright and sharper; all connected at the claws into a tube, of different lengths in the different species: the stamina have three awl-shaped filaments, incumbent on the reflex petals: anthers oblong, straight, depressed: the pistillum is an inferior oblong germ: style simple, very short: stigmas three, petal-form, oblong, carinated within, furrowed without, incumbent on the stamens, two-lipped: outer lip smaller, emarginate: inner larger, bifid, subinflected: the pericarpium is an oblong, cornered capsule, three-celled, three-valved: the seeds several and large.

The species cultivated are: 1. *I. pumila*, Dwarf Iris; 2. *I. susiana*, Chalcedonian Iris; 3. *I. Florentia*, Florentine Iris; 4. *I. biflora*, Twice-flowering Iris; 5. *I. aphylla*, Leafless Iris; 6. *I. variegata*, Variegated Iris; 7. *I. Germanica*, German Iris; 8. *I. sambucina*, Elder-scented Iris; 9. *I. squalens*, Brown-flowered Iris; 10. *I. cristata*, Crested Iris; 11. *I. tricuspis*, Trifid-petalled Iris; 12. *I. Xiphium*, Bulbous-rooted Iris; 13. *I. Pseudacorus*, Common Yellow or Water Iris; 14. *I. fœtidissima*, Stinking Iris; 15. *I. Virginica*, Virginian Iris; 16. *I. versicolor*, Various-coloured Iris; 17. *I. ochroleuca*, Pale-yellow Iris; 18. *I. verna*, Spring Iris; 19. *I. Persica*, Persian Iris; 20. *I. graminea*, Grass-leaved Iris; 21. *I. spuria*, Spurious Iris; 22. *I. Sibirica*, Siberian Iris; 23. *I. Martinicensis*, Martinico Iris; 24. *I. Pavonia*, Peacock Iris; 25. *I. tuberosa*, Snake's-head Iris.

The first has the root brownish on the outside, white within, knobbed, with pale fibrils: the leaves acute, sometimes shorter, sometimes longer than the flower: the stem or scape very short, often scarcely an inch in length: germ oblong, bluntly and obscurely three-cornered, an inch long, inclosed within two spathes, ending in the tube of the corolla, which is slender, and from two to three inches in length: all the petals are almost entire, blue or purple, varying much in colour, insomuch that the same flower changes, and from blue becomes more and more red: outer beards blue, inner white, with yellow tips. It is a native of Austria, flowering in April.

There are varieties with white flowers, with straw-coloured flowers, with pale blue flowers, with blush-coloured flowers, with yellow variable flowers, with blue variable flowers.

The second species has the scape simple, round, grooved, a span high: the leaves alternate, sheathing, upright, very finely striated, obscurely waved: the corolla the largest of all the species, very thin: the claws of the larger petals purple on the outside, dotted and streaked

with purple within; border suborbiculate, waved, bent in at top, upright: border of the smaller petals ovate, bent down, with the edge frequently bent back, blunt, of the same colour with the larger ones, but shorter and narrower; the claws bearded within from the flexure to the base with brownish-yellow cilias. It flowers at the end of May or beginning of June, and is a native of the Levant.

The third has the scape round, striated, simple, upright, a foot high and more, bearing two or three flowers: the leaves nerved, subfalcated, obscurely curved on the outer edge: the lower petals connate at the base: the claws of the larger ones thickish, with a thin winged edge, an inch long, green on the outside, bearded within, with white cilias, yellow at the top: border blunt, emarginate, an inch wide, a little more in length, hanging down, white, striated near the flexure: smaller petals oblong, from upright bent in with a reflex margin, blunt, emarginate, white: claws thickish, attenuated, greenish. It is a native of the South of Europe, flowering in May and June.

The fourth species has the scape simple, striated, longer than the leaves, a span in height, sustaining two or three flowers, sometimes four: the leaves subfalcated, acute, striated, from erect patulous: the petals violet-coloured, entire: capsule cylindric, with three streaks. It is a native of Portugal, flowering in April and May, and again in autumn, whence the name.

The fifth has three or four large bright purple flowers, which stand above each other, and have purplish sheaths: the three bending petals or falls are striped with white from the base to the end of the beard: the capsules are large, blunt, and triangular. It flowers at the end of May. Its native place is unknown.

The sixth species has the scape striated, scarcely longer than the leaves, a foot and more in height: leaves acute, striated, upright; the lower ones the length of the scape, but the upper ones gradually shorter: the flowers at the top of the scape divided, alternate, coming out successively, handsome, yellow, netted with black: the upper part of the stem is naked, and divides into three branches, each of which has two or three flowers one above another: the three upright petals or standards are yellow, and the bending petals or falls are variegated with purple stripes. It flowers in June, and is a native of Hungary.

The seventh has the scape divided at top, larger than the leaves: the leaves reflex-falcated, nerved, an inch wide: the flowers blue, with the smaller petals quite entire, having an agreeable scent: the stalks rise near four feet high, and divide into several branches, each supporting three or four flowers, which are covered with a thin sheath; the three bending petals or falls are of a faint purple inclining to blue, with purple veins running lengthwise: the beard is yellow, and three erect petals or standards are of a bright blue, with some faint purple stripes. It is a native of Germany, flowering in May and June.

The eighth species has the scape divided at top, longer than the leaves, two (or three) feet high: the leaves inflex-falcated at top, striated, the upper ones gradually shorter. It resembles the seventh, from which it differs in having the larger petals of a deeper violet colour, and subemarginate; the smaller petals emarginate, and of a deeper blue colour: the stigmas acute and serrate, with a blueish keel. It derives the trivial name from the smell of the flowers, which is very like that of Elder in bloom. It flowers at the end of May, and in June, and is a native of the South of Europe.

In the ninth, the roots are very thick, fleshy, and divided into joints, spreading just under the surface of the ground: they are of a brownish colour on their outside, but white within: the leaves rise in clusters, embracing each other at their base, but spread asunder upwards in form of wings: they are a foot and a half long, and two inches broad, having sharp edges, ending in points like swords: the stalks between these, which are a little longer than the leaves, having at each joint one leaf without a foot-stalk; these diminish in their size upwards: the stalks divide into three branches, each of which produces two or three flowers one above another at distances, each inclosed in a sheath: they have three large violet-coloured petals which turn backward, and are called falls: these have beards near an inch long on their midrib towards their base, and have a short arched petal which covers the beard, with three broad erect petals of the same colour, called standards: the stamina lie upon the reflexed petals. It flowers in June. It is a native of the South of Europe.

There are varieties with blue standards and purple falls, with pale purple standards, with white standards, and with a smaller flower.

The tenth species has a tuberous, creeping root: the stems several, short, inclining upwards, compressed, leafy: the leaves scarcely six inches long, sharpish, a little curved like a sickle at the tips, entire, with a pale membranaceous margin: the flower generally solitary, a little shorter than the leaves, erect, of a pale purplish blue: outer petals drooping, obtuse, blue, with deeper blue spots, crested in the place of the beard with three longitudinal, elevated, waved ribs, variegated with orange and yellow; inner petals narrower,

pointed, uniform in colour. It is a native of North America; flowering in May.

In the eleventh species, the bulb is the size of a hazel nut: the scape simple, round, jointed, upright, bearing one or two flowers, a foot and half in height: the leaf single, nerved, upright, with the tip hanging down, two feet long: the border of the larger petals white, suborbiculate, with a point; claws green on the outside, yellow within, dotted with black: the smaller petals several times shorter and less: claws convex on the outside, green, concave within, dotted with brown, the length of the larger ones, but narrower; segments lanceolate, divaricating, a line in length, the middle one of the three a little longer, white dotted with brown. It is a native of the Cape.

It varies in the shape of the larger petals, and much in the colours, as blue, purple, yellow, white, and spotted.

The twelfth has the leaves channelled and convoluted, not only at the base, as in the other species, but the whole length of them; they are awl-shaped at the tip, and shorter than the scape: the flowers are blue, with emarginate petals. It is a native of the South of Europe.

There are varieties with blue flowers, with violet-coloured flowers, with white flowers, with purple flowers, with yellow flowers, with blue standard petals and white falls, with blue standards and yellow falls, with striped flowers, the broad-leaved with blue flowers, the broad-leaved purple-flowered, the sweet-scented blue-flowered, the sweet-scented purple flowered, with variegated sweet-scented flowers, and the double-flowered.

The thirteenth has a fleshy root, the thickness of the thumb, spreading horizontally near the surface, blackish on the out side, reddish and spongy within, the upper part covered with numerous ridged fibres, the lower part sending down many long, whitish, wrinkled, stringy roots: the leaves from the root two or three feet long, upright, an inch or more in breadth, striated, having a prominent longitudinal mid-rib, equal to the scape, deep green, smooth: stem-leaves shorter, forming a sheath at the bottom: scapes from one to three feet in height, upright, alternately inclined from joint to joint, round or flatted a little, smooth and spongy: the peduncles axillary, flat on one side, and smooth; each sustaining two or three flowers, the two outer (when there are three) having one sheath, and middle flower two. It is common in most parts of Europe; flowering at the end of June, or the beginning of July.

The fourteenth species has a thick, tufted, fibrous root: the leaves grass-green, when broken emitting a strong odour, not much unlike that of hot roast beef at the first scent. They are acute and nerved, rather shorter than the scape; which is single, cylindrical, but angular on one side, jointed, sheathed with alternate spathaceous leaves, two feet high, bearing several flowers. It is a native of France, &c.

The fifteenth has the root white within, black without, the thickness of the thumb, having white fibres, and bristly at top, with the remains of leaves: the scape compressed, upright, jointed, sheathed with alternate leaves, many-flowered, the length of the leaves, or a little higher, a foot in length: the leaves narrow, sharp, curved-in at the tip, nerved and smooth, as is the whole plant: the spathes membranaceous, acute, brownish, shorter than the peduncles, very thin at the edge and tip: the peduncles two or three inches long, round, slender, upright, one-flowered: the flowers elegant, but without scent: claws of the outer petals channelled, green on the outside, yellow on the inside, streaked with dark purple: border flat, rounded-ovate, blunt, quite entire, pale at the base, then blue with deep-blue streaks: inner petals spatulate, blunt, upright, shorter, bluer and streaked. It is a native of Virginia, flowering here in June and July.

The sixteenth species has the scape jointed, bifid at the top, or simple, many-flowered, higher than the leaves, two feet in length: the leaves alternate, sheathing; the upper ones gradually shorter: the flowers blue, large. Mr. Curtis remarks, that it has, for the most part, a stalk unusually crooked or elbowed. It is a native of North America, flowering in May and June.

The seventeenth has the scape round or roundish, covered with the sheaths of leaves, many-flowered, longer than the leaves, a foot high: the leaves falcated, acute, striated, nerved: spathes membranaceous at the edge: the larger petals dilated at the base with dusky veins; lesser snowy-white, with yellowish veins at the base: stigmas snowy-white. From its being the highest of the species of Iris cultivated in gardens, Mr. Curtis has named it *Tall Iris*. It is a native of the Levant, flowering in July.

The eighteenth species has tufted fibrous roots, from which arise many grass-like leaves about nine inches long; from between them come out the stalks, which are shorter than the leaves, and support one purple flower with blue standards. It flowers in May, and is a native of North America.

The nineteenth has an oval bulbous root, from which come out five or six pale-green leaves, hollowed like the keel of a boat, about six inches long, and one inch broad at the base, ending in points: between these the flower-stalk arises, which is seldom above three inches high, supporting one or two flowers, inclosed in spathes:

these have erect petals or standards, of a pale sky-blue colour, and three reflexed petals or falls, which on their outside are of the same colour, but the lip has a yellow streak running through the middle, and on each side are many dark spots, with one large deep-purple spot at the bottom: the leaves are striated and nerved, unequal, and a span in length. It is a native of Persia.

This is greatly esteemed for the beauty and extreme sweetness of its flowers, as also for its early appearance in the spring, being generally in perfection in February or the beginning of March, according to the season.

Martyn observes, that "like the Hyacinth and Narcissus, it will blow within doors in a water-glass, but stronger in a small pot of sand or sandy loam, and a few flowers will scent a whole apartment."

The twentieth species has narrow, flat, glass-like leaves, about a foot long, of a light-green colour; between these arise the stalks about six inches high, having two narrow leaves much longer than the stalks: the flowers two or three, small: the petals have a broad yellow line with purple stripes; the three falls are of a light purple colour striped with blue, and have a convex ridge running along them: the others are of a reddish purple variegated with violet; they have a scent like fresh plums. It is a native of Austria, flowering in June.

The twenty-first has a knobbed root, blackish on the outside, whitish within, with long pale fibres: the stem round, very slightly compressed, straight or a little flexuose, from two to three feet in height, taller than the leaves: the flowers commonly two, on short peduncles, each involved in its spathe; sometimes there are three; they have no scent: the colour blue-purple; but under the stigmas the reflex petals are more inclined to red: upright petals flat, and usually quite entire. According to Miller, the flowers have light blue standards, and purple variegated falls, having a broad white line in the middle instead of the beard. It is a native of Germany, &c. flowering in July.

The twenty-second species has a higher stem, the scape a foot high or more, dividing at top, three-flowered or many-flowered, longer than the leaves; which are nerved and flat: the flowers blue, in brown scariose spathes: the inner petals are upright: the germ trigonal, not grooved at the angles. It is a native of Siberia, &c. flowering in May and June.

The twenty-third has a solid sub-bulbose root, surrounded by whitish fibres, and throwing out other tubers: the stem upright, roundish, two feet high, simple: the root-leaves acuminate, quite entire, somewhat rigid, distich, flat, keeled at the base, above simple, from upright spreading, few: the flowers few, coming out successively from the same spathe, yellow, without scent, peduncled: the petals have a black shining glandular hole or pit, like that which is common to several species of Ranunculus. It is a native of Martinico; flowering in November and December.

The twenty-fourth species has the scape round, jointed, villose, simple, a foot high, sustaining one or two flowers: the leaf somewhat channelled, striated, villose, the length of the scape: the spathes acute, striated, smooth, two inches long: the peduncles subancipital, one-flowered, smooth: all the petals united at the base: the three outer several times bigger than the others, ovate, obtuse, entire; the three inner much narrower and shorter by half, lanceolate, acute. This beautiful flower is orange-coloured, with black spots and dots at the base, and a hart-shaped blue spot above the base, which at bottom is tomentose and black. It is a native of the Cape.

The twenty-fifth has a tuberous root; there arise from it five or six long narrow four-cornered leaves, and from between these the stalk, supporting one small flower, of a dark purple colour. It flowers in April, but does not produce seeds in this climate. It is a native of the Levant.

Culture.—Most of the sorts may be readily increased, by parting the roots or separating the off-sets from the bulbs, and planting them out in the situations where they are to flower; the first sort in the autumn, or very early in the spring, and the latter in the close of summer, when the leaves decay, managing them in the same manner as other bulbs. As they increase and spread rapidly in their roots, they should be divided and taken off every two or three years.

New varieties of the different sorts may be raised from seed, by sowing it in the autumn in a bed of light sandy mould. The plants come up in the following spring, and in the autumn may be transplanted where they are to grow. They flower a year or two afterwards.

The bulbous-rooted sorts succeed best in such soils as are of the light, sandy, loamy kind.

The last sort answers most perfectly in such aspects as are towards the east, the roots being prevented from going too deep.

As the second sort is liable to be injured by severe winters, a few should be planted in pots to have protection. This sort is well suited for forcing.

When planted in the open ground, it requires a rather dry soil and situation.

Painted by Syd. Edwards. London Published Aug. 1. 1806. by C. Kearsley Fleet Street. Engraved by F. Sansom

1 *Iris germanica* German Iris

2 *Iris versicolor* Various coloured Iris

3 *Iris variegata* Variegated Iris

The Cape sorts should be retained in the dry stove, and be propagated and managed in the same manner as other bulbous-rooted plants of the same kind.

All the sorts are proper for affording variety in the borders, clumps, and other parts of pleasure-grounds; and some of the more tender sorts among potted plants of similar growths.

IRON-WOOD. See SIDEROXYLON.

ITEA, a genus containing plants of the hardy deciduous shrubby kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Rhododendra*.

The characters are: that the calyx is a one-leafed perianthium, five-cleft, upright: segments lanceolate, acute, permanent, coloured: the corolla has five petals, sessile, lanceolate, acuminate, spreading, deciduous: the stamina have five awl-shaped, upright filaments, the length of the corolla, inserted into the base of the calyx: anthers roundish, incumbent: the pistillum is an ovate superior germ: style permanent, cylindrical, the length of the stamens: stigmas two, blunt: the pericarpium is an ovate capsule, longer than the calyx, mucronated by the style, two-celled, two-valved, many-seeded: the seeds very small, oblong, and shining.

The species cultivated are: 1. *I. Virginica*, Virginian Itea; 2. *I. cyrilla*, Entire-leaved Itea.

The first is a shrub six or seven feet high, sending out many branches from the bottom to top: the leaves are alternate, slightly serrate, reflex, veined, light green. At the extremity of the same year's shoots, in the month of July, are produced fine spikes of white flowers, three or four inches long, and erect. When this shrub is in vigour, it is entirely covered with these flowers, making a fine appearance. It is a native of North America.

The second species is also a shrub, three feet in height: the stem is upright, somewhat branched, round, ash-coloured: branches alternate or scattered, spreading, angular, rufous, smooth: the leaves alternate, bluntish, revolute, with the edges a little waved, one-nerved: the midrib marked with lines above, prominent underneath, smooth, paler underneath, dry, spreading, flat, permanent, three inches long, and an inch wide: the petioles very short, cylindric below, flat above, reddish: the racemes very many, lateral at the base of the new shoots, one from each bud, on short peduncles, spreading, from four to six inches long: the flowers are scattered, pedicelled, spreading, white, two or three lines in diameter. It is a native of Carolina, flowering in July and August.

Culture.—The first is capable of being increased by layers, which should be laid down in the autumn, when they will put out roots so as to be fit to take off by the following autumn, when they may be removed into the nursery, or the places where they are to grow. It does not succeed well on dry gravelly soils.

It may also be raised from seed, by sowing it in the spring, as soon as procured from abroad.

The second sort may be increased by layers or cuttings, planted in pots of good mould in the spring; in the latter case, placing them in a mild hot-bed till they have stricken root, afterwards removing them into separate pots, placing them in airy situations in the green-house.

The first is very ornamental in the borders and clumps, and the latter among green-house collections.

IVA, a genus containing plants of the hardy, deciduous, shrubby, and herbaceous annual kinds.

It belongs to the class and order *Monœcia Pentandria*, and ranks in the natural order of *Compositæ Nucamentaceæ*.

The characters are: that the calyx is common roundish: leaflets about five, subovate, blunt; almost equal, permanent, containing very many florets: the corolla compound convex: corollets male, very many in the disk; female five in the ray; proper, males one-petalled, funnel-form, five-toothed, the length of the calyx; females none: stamina males, five filaments, bristle-shaped, the length of the corollet: anthers erect, approximating: the pistillum females, oblong germ, the length of the calyx: styles two, capillary, long; stigmas acute: there is no pericarpium: calyx unchanged: the seeds solitary, naked, the length of the calyx, at top thicker, blunt: the receptacle chaffy; chaffs linear, and interior.

The species are: 1. *I. annua*, Annual Iva; 2. *I. frutescens*, Shrubby Iva, or Bastard Jesuit's-bark-Tree.

The first is an annual plant, with an herbaceous stalk, rising from two to three feet high, sending out several branches from the sides: the leaves have three deep longitudinal veins and are serrate: the stalks and branches are terminated by small clusters of pale blue flowers, which appear in July, and the seeds ripen in autumn. It is a native of South America.

The second species has slender woody branches, eight or ten feet high: the leaves serrate: the branches terminated by small clusters of pale purple flowers. It is a native of Virginia, flowering in August.

Culture.—The first sort is raised by sowing the seeds on a moderate hot-bed in the spring, and when the plants are fit to remove, placing

them in another hot-bed, treating them as the less tender annual sorts.

In the second sort, the young branches should be layed down in the spring, when they will have put out roots in about six months; or cuttings may be planted in a shady border in May, and when they have taken root, removed with earth about their roots to the places where they are to grow. It succeeds best in a dry soil and warm sheltered situation.

The first affords ornament among the less tender annuals, and the latter in the warm borders and clumps in shrubberies.

JUDAS TREE. See CERCIS.

JUGLANS, a genus containing plants of the hardy deciduous tree kind.

It belongs to the class and order *Monoecia Polyandria*, and ranks in the natural order of *Amentaceæ*.

The characters are: that in the male flowers the calyx is a cylindrical ament, imbricate-scattered all round, with one-flowered scales, turned outwards: perianthium elliptic, flat, six-parted: segments upright-concave, blunt: there is no corolla: the stamina have many filaments (eighteen to twenty-four, twelve to twenty-four) very short: anthers oval: female flowers heaped: the calyx is a one-leafed perianthium, bell-shaped, four-cleft, upright, very short, one-flowered: the corolla one-petalled, four-cleft, upright, acute, a little larger than the calyx: (none:) the pistillum is an oval germ, large, inferior: style very short: (styles two:) stigmas two, large, reflex, jagged at top: the pericarpium is a dry drupe, oval, large, one-celled: the seed a nut, very large, roundish, netted-grooved, half-four-celled: (corticated, two-valved: nucleus four-lobed, variously grooved.

The species cultivated are: 1. *J. regia*, Common Walnut-tree; 2. *J. alba*, White Walnut-tree, or Hickery; 3. *J. nigra*, Black Walnut-tree.

The first is a very large and lofty treee, with strong spreading boughs: the leaves pinnate, with a very strong but not unpleasant smell: the leaflets three pairs (sometimes two or four), nearly equal, except that the odd one is larger; they are entire, smooth, and shining: the male flowers in close, pendulous, subterminating aments: the females scattered, frequently two or three together: fruit an ovate, coriaceous, smooth drupe, inclosing an irregularly grooved nut, which contains a four-lobed, oily, eatable kernel, with an irregular knobbed surface, and covered with a yellow skin. It is a native of Persia.

Martyn remarks, that as "they all vary again when raised from the seed, and that as nuts from the same tree will produce different fruit: persons who plant the Walnut for its fruit, should make choice of the trees in the nurseries, when they have their fruit upon them."

There are several varieties, as the Oval Walnut, the Round Walnut, the Large Walnut, the Small-fruited Walnut, the Double Walnut, the Early Walnut, the Late Walnut, the Tender Thin-shelled Walnut, and the Hard Thick-shelled Walnut.

The second species has the leaves composed of two or three pairs of oblong lobes, terminated by an odd one; these are of a light green, and serrate; the lower pair of lobes are the smallest, and the upper the largest: the fruit is shaped like the common Walnut, but the shell is not furrowed, and is of a light colour. According to some, it is a tall tree. In North America, where it prevails, it is termed Hiccory Nut-tree.

The third grows to a large size: the leaves are composed of five or six pairs of leaflets, which end in acute points and are serrate; the lower pair is the least, the others gradually increase, but the pair at top and the terminating leaflet are smaller: these leaves when bruised emit a strong aromatic flavour, as does also the outer cover of the nuts, which is rough, and rounder than that of the first sort. The shell is very hard and thick, and the kernel small, but very sweet to the taste.

Culture.—All the sorts are capable of being increased by planting the seed or nuts, which in the first sort should be of the best varieties when intended as fruit trees, after they are become perfectly ripe, and have been preserved in dry sand till about the end of February, either in slight drills, five or six inches apart in the rows, and a foot distant, or by the dibble, at the same distances, putting them in to the depth of two or three inches, the ground having been previously well dug over. When the plants have had two years growth in the seed-bed, they should be removed into nursery rows, shortening the tap roots, but preserving the tops entire, putting them at the distance of two feet and a half from row to row, and a foot and half in the rows: they should remain in this situation till they have attained five or six feet in height, training them with single stems; after which they may be removed into the situations where they are to grow.

When the trees are intended for timber, it is a good practice to plant them out at once where they are to grow, as they thrive faster, and form better trees.

In raising the Walnut for fruit, Mr. Boutcher, however, recommends flat stones, tile-sherds, or slates, to be buried eight inches deep,

under the nuts when they are set: the distance to be six inches, and the depth two inches. After two seasons they should be removed early in autumn, and planted fourteen or sixteen inches asunder, on the same kind of bottom, or any hard rubbish, to prevent them from striking downwards, and to induce them to spread their roots on the surface. At the end of two or three years this should be repeated again, making the bedding at the depth of fifteen or sixteen inches, and planting them two feet asunder: here let them remain three or four years, when they will be fit to remove for the last time. The soil for fruit-trees should be dry and sound, with a sandy, gravelly, or chalky bottom. The trees managed in this way, he says, will have higher flavoured fruit, ripen earlier, and bear a plentiful crop twenty years sooner than in the usual method. The best manure for them is ashes, spread the beginning of winter, the land having been first ploughed or dug over.

And as plants raised from the nuts of the same tree bear fruit of very different qualities, he advises the inarching one of the best sorts on the common Walnut-tree; by which method the planter is secure of his sort, and will have fruit in one-third of the time that he would obtain it from the nut. This method can, however, be practicable only in few situations. The length of time in which the Walnut bears well from the nut is about twenty years.

The nuts of the two other sorts are procured from America by the nurserymen.

The first sort is cultivated for ornament, as well as the nut or fruit which it affords. The fruit is used in two different stages of its growth; as, when green, to pickle; and when ripe, to eat the kernel. For the first purpose, the young green Walnut, when about half or near three parts grown, before the outer coat and internal shell become hard, is most excellent; for which they are generally ready in July or the following month, and should be gathered by hand, chusing such as are as free from specks as possible.

The fruit is discovered to be fully ripe by the outer husk easily separating from the nut, or by the husks sometimes opening, and the nuts dropping out; it is usually about the latter end of September, which, in trees of considerable growth, is commonly beaten down with long poles; for, as the Walnuts grow mostly at the extremity of the branches, it would, in very large spreading trees, be troublesome and tedious work to gather them by hand. As soon as gathered, they should be laid in heaps a few days to heat and sweat, to cause their outer husks, which closely adhere, to separate from the shell of the nuts; then be cleaned from the rubbish, and deposited in a dry room for use, covering them over close with dry straw, a foot thick, where they will keep three or four months. They are always ready sale at market, in large towns, where, at their first coming in, they are brought with their husks on, and sold by the sack, or bushel, but afterwards cleaned, and sold both by measure and the thousand.

Plantations of these trees are therefore profitable, in their annual crops of fruit, while growing, and in their timber, when felled or cut down.

These, as well as the other sorts, may many of them be admitted into clumps and plantations, in large pleasure-grounds, for variety. After one or two years the other sorts are nearly as hardy as the first; but till that time should be protected against frosts in the winter season.

JUNIPERUS, a genus containing plants of the evergreen tree and shrub kinds.

It belongs to the class and order *Dioecia Monadelphia*, and ranks in the natural order of *Coniferæ*.

The characters are: that in the male the calyx is a conical ament, consisting of a common shaft, on which are disposed three opposite flowers in triple opposition; a tenth terminating the ament: each flower has for its base a broad, short, incumbent scale affixed to the column of the receptacle: there is no corolla: the stamina have filaments (in the terminal floscule) three, (four to eight), awl-shaped, united below into one body: (in the lateral flowers scarce manifest:) anthers three, distinct in the terminal flower, but fastened to the calycine scale, in the lateral ones: in the females the calyx is a three-parted perianthium, very small, growing to the germ, permanent: the corolla has three petals, permanent, rigid, acute: the pistillum is an inferior germ: styles three, simple: stigmas simple: the pericarpium is a fleshy berry, roundish, marked on the lower part with three opposite obscure tubercles (from the calyx having grown there), and at the tip by three teeth (which before were the petals), umbilicated: the seed three ossicles, convex on one side, cornered on the other, oblong.

The species cultivated are: 1. *J. communis*, Common Juniper; 2. *J. Oxycedrus*, Brown-berried Juniper; 3. *J. thurifera*, Spanish Juniper; 4. *J. Barbadensis*, Barbadoes Juniper; 5. *J. Bermudiana*, Bermudas Juniper; 6. *J. Sabina*, Savin; 7. *J. Virginiana*, Virginian Juniper, or Red Cedar; 8. *J. Phœnicea*, Phœnician Juniper, or Cedar; 9. *J. Lycia*, Lycian Juniper, or Cedar.

The first is a low shrub, seldom rising more than three feet high, sending out many spreading tough branches, which incline on every

side, covered with a smooth, brown, or reddish bark, with a tinge of purple: the leaves narrow, awl-shaped, ending in acute points, placed by threes round the branches, pointing outwards, bright green on one side, and gray on the other, continuing through the year: the male flowers are sometimes on the same plant with the females, but at a distance from them; but they are commonly on distinct plants: the female flowers are succeeded by roundish berries, which are first green, but when ripe of a dark purple colour, continuing on the bush two years. It is common in all the northern parts of Europe.

The second species has the branchlets three-sided: the leaves sessile (by no means adnate), altogether as in the first sort, but larger in all the parts: berries rufescent, the size of a hazel-nut: the height ten or twelve feet, branched the whole length: branches small and taper, having no angles, as most of the other Junipers have: the male flowers at the ends of the branches in conical scaly aments: the berries below from the side of the same branch: it is feathered from top to bottom, if left untouched from the first planting, or if not crowded with other trees: the short sharp-pointed leaves give the shrub a fine look; and the large brownish red berries have a handsome appearance when ripe. It is a native of Spain.

The third grows to the height of twenty-five or thirty feet, and sends out many branches, which form a sort of pyramid: the leaves are acute, lying over each other in four rows, so as to make the branches four-corned: the berries very large, and black when ripe. It is a native of Spain.

The fourth species has been confounded with the Bermudas Cedar; but the branches spread very wide, the leaves are extremely small, and are every where imbricate: the bark is rugged, splits off in strings, and is of a very dark colour: the berries are smaller than those of the Bermudas Cedar, and are of a light brown colour when ripe. It is a native of the West Indies, where it rises to be one of the largest timber trees.

The fifth, or Bermudas Cedar, whilst young, has acute-pointed leaves, which spread open, and are placed by threes round the branches; but as the trees advance their leaves alter, and the branches become four-cornered: the leaves are very short, and lie over each other by fours round the branches: the berries are produced towards the ends of the branches, and are of a dark red colour, inclining to purple: the wood has a very strong odour. It is a native of America.

The sixth is divided into two species by Miller; the Common, or Cypress-leaved, and the Tamarisk-leaved, or Berry-bearing Savin. In the first the branches grow more erect, the leaves are shorter, and end in acute points, which spread outwards: it rises to the height of seven or eight feet, and produces great quantities of berries. The second sends out its branches horizontally, and seldom rises more than three or four feet high, but spreads to a considerable distance every way: the leaves are very short, acute-pointed, running over each other along the branches, with the ends pointing upwards: the berries are smaller than those of the first, but of the same colour, and a little compressed: the whole plant has a very rank odour when handled. It is a native of the South of Europe.

There is a variety with variegated leaves.

The seventh has the leaves mutually opposite by threes, fastened at the base by their inner side, in the new shoots imbricate in four rows, giving them the appearance of being quadrangular; the year following these spread from the branch at an acute angle, and appear to be disposed in six rows or longitudinal phalanges: the berry dark blue, covered with a white resinous meal. It is a native of North America, &c.

There are varieties, as the Swedish, or Tree Juniper, which rises to the height of ten or twelve (even sixteen or eighteen) feet: the branches grow more erect than those of the common Juniper; the leaves are narrower, end in more acute points, and are placed further asunder on the branches: the berries also are longer.

The Alpine, or Mountain Juniper, which has the leaves broader and thicker: the berries rather oval than spherical.

The eighth species grows with its branches in a pyramid: the lower ones have short, acute-pointed, grayish leaves, pointing outwards; but those on the upper branches are dark-green and imbricate, ending, however, in acute points: the male flowers are produced at the extremity of the branches, in a loose, scaly, conical ament, standing erect on a short peduncle: the fruit is sometimes upon the same tree, at a distance from the male flowers, but more generally on separate trees: the berries pale yellow when ripe, about the size of those of the first sort. It is a native of the South of Europe.

The ninth has the branches growing erect, and covered with a reddish-brown bark: the leaves small, obtuse: the male flowers at the ends of the branches in a conical ament; and the fruit single from the axils below them, on the same branch: the berries large, oval, and when ripe brown. It is a native of the South of France.

Culture.—All these plants, except the fifth sort, may be increased either by seeds, layers, or cuttings. The latter methods are proper for the Savin kinds.

The seeds or berries should be sown in beds of light earth, in the early autumn or spring, but the former is the better in light soils, in a warm sheltered situation, in the open ground, being well raked in. The beds should be kept perfectly clear from weeds, and the young plants be occasionally watered during the summer season. When the plants have had two years' growth in these beds, and are become strong, they should be removed into nursery rows at two feet apart, and a foot or eighteen inches distant in the rows. They should remain in these situations till of proper growth to be planted out where they are to remain.

The layers of the young branches should be laid down at either of the above seasons, and, when well rooted taken off, and planted in the nursery, in the same manner as the seedling plants.

The cuttings should be made from the young branches, and be planted in a shady border, in the latter end of summer, watering them occasionally till they have stricken good root; when they may be taken up with earth about their roots, and be managed in the same manner as by the other methods.

The plants raised in these last ways seldom grow so upright, or to so large a size, as in the seed method.

The common upright and striped Savins may likewise be increased by planting slips of the young branches; for the last sort the most variegated being made use of, in the latter end of summer, or in the autumn, in a shaded border, due water being given. When the plants are come up, they must be managed as the other sorts.

The fifth sort must be sown in pots or tubs, at the same seasons as the other sorts, being placed in a frame to have the protection of glasses when the weather is frosty and severe. As the seeds are long in coming up, the mould in the pots, &c. must remain undisturbed till they appear, being shaded from the sun, and slightly watered occasionally. The young plants should be kept quite free from weeds, and be duly watered till they have attained sufficient growth to be removed into separate small pots, filled with light earth, which is generally when from one to two years old. In removing them, they should have balls of earth preserved about their roots, and be watered, and placed in a warm situation. The best season for this is in the early spring. But it is of great advantage to plunge the pots in a mild hot-bed. They must be protected in the winter, either in frames, or under a warm fence, the pots being plunged in the earth. When they have been removed into different larger pots till of sufficient large growth, they may be planted out where they are to grow, which should be in a warm situation. It is proper to shelter them the first two winters during severe frosts, by mats, or other similar coverings.

The proper periods for removing all the different sorts into the open ground, are in the early autumn or spring months.

These plants all succeed in the open ground, and grow in any common soil and situation, with other hardy plants of the tree kind, though they are the most prosperous in a light sandy soil, where the aspect is sheltered.

In placing these kinds of plants in the clumps and shrubbery plantations, attention should be had to arrange them according to their degrees of growth, so as to exhibit a regular gradation of height, placing the low-growing sorts, as the common Juniper and Savin kinds, towards the fronts, and the other larger growing sorts more backwards, in assemblage with other ornamental shrubs and trees of the evergreen tribe; and some may be placed as single standards, on open spaces of short grass, in the pleasure-ground quarters. Some of the large-growing sorts may also be introduced into the forest-tree plantations; as they have a fine effect, and afford excellent timber for many uses, more particularly the Virginia Cedar, which arrives at a considerable size, especially when the under branches are trimmed off occasionally while young.

JUPITER'S BEARD. See ANTHYLLIS.

JUSTICIA, a genus containing plants of the shrubby and herbaceous kinds.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a one-leafed perianthium, very small, five-parted, acute, upright, narrow: the corolla one-petalled, ringent: tube gibbose: border two-lipped: lip superior oblong, emarginate: lip inferior, of the same length, reflex, trifid: the stamina have two awl-shaped filaments, hid under the upper lip: anthers upright, bifid at the base: the pistillum is a top-shaped germ: style filiform, length and situation of the stamens: stigma simple: the pericarpium is an oblong capsule, obtuse, narrowed at the base, two-celled, two-valved: the partition opposite to the valves, gaping with an elastic claw: the seeds roundish.

The species cultivated are: 1. *J. sexangularis*,

Chickweed-leaved Justicia; 2. *J. Scorpioides*, Scorpion-tail Vera Cruz Justicia; 3. *J. Ecbolium*, Long-spiked Justicia; 4. *J. Adhatoda*, Malabar Nut; 5. *J. hyssopifolia*, Snap-tree.

The first is an annual plant, with an upright stalk, having six angles, rising two or three feet high, and dividing into many branches: the leaves opposite, an inch and half long, and one inch broad; smooth, as are also the stalks: at each joint come out clusters of small bractes: long before the stalks decay, most of the leaves fall off, leaving only these bractes: the flowers are in small spikes at the side of the branches, sitting very close: they are of a beautiful carmine colour. It is a native of La Vera Cruz, &c.

The second species has a brittle stem, five or six feet high, sending out many branches: the leaves two inches long, and one inch broad, hairy, opposite: the flowers large, of a carmine colour, and ranged on one side of the spike. It is a native of La Vera Cruz.

The third has a roundish stem, compressed, jointed: the leaves petioled, smooth, acuminate, quite entire: the spike strobile-shaped, with spreading, upright bractes: it grows five feet high: the flowers grow in very long spikes from the end of the branches, and are of a greenish colour, with a shade of blue. It is a native of the East Indies.

The fourth species rises here with a strong woody stem to the height of twelve or fourteen feet, sending out many spreading branches: the leaves more than six inches long, and three inches broad, placed opposite: the flowers on short spikes at the end of the branches. It flowers in July, and is a native of Ceylon.

The fifth has the stem from three to four feet high, sending out branches on every side from the bottom, so as to form a pyramid; they are covered with a white bark: the leaves entire, near two inches long, and one third of an inch broad, smooth, stiff, deep green, opposite: at the base of the foot-stalks come out clusters of smaller leaves, of the same shape and texture: the peduncles short: the flowers white, with long calyxes: the capsules oblong, when ripe throwing out their seeds, whence the name of Snap-tree. It is a native of the Canary islands.

Culture.—These plants may be increased, some of them by seeds, and the others by layers and cuttings; but the latter modes are mostly practised, as the seeds are obtained with difficulty.

Where the seeds are capable of being procured, they may be sown in small pots filled with light fresh earth, in the early spring, being plunged in a hot-bed of bark, watering the mould of the pots moderately when it becomes dry. As they often remain long before the plants appear, the pots should not be disturbed, but be kept in the hot-bed. When the plants appear, fresh air should be admitted in mild weather, and slight waterings given; and when they have attained a few inches in growth, they should be removed into separate pots filled with fresh earth, replunging them in the hot-bed, watering and shading them till they have taken fresh root; air being then freely admitted, and as the season grows warm, due waterings being given. As they advance in growth, they should be placed in larger pots, taking care not to overpot them, keeping them constantly in the hot-bed.

The layers should be laid down in the early spring, in pots filled with light earth, a little water being given at the time.

The cuttings may be made from the young shoots, and planted in pots filled with the same sort of earth in the later spring or summer months, giving them a little water, and plunging them in the hot-bed of bark in the stove, due shade being given.

When the plants have become perfectly rooted, they may be taken off, or removed into separate pots, keeping them constantly in the stove or green-house, according as they are more or less hardy. The two first sorts are the most hardy; the others succeeding best in the hot-house or stove.

The two first afford ornament and variety among the other potted plants of the less tender sorts, and the other among those of the stove kinds.

IVY. See HEDERA.

IXIA, a genus containing plants of the herbaceous, bulbous, and tuberous root perennial kind.

It belongs to the class and order *Triandria Monogynia*, and ranks in the natural order of *Ensatæ*.

The characters are: that the calyx is a spathe, bivalve, inferior, shorter than the corolla: valves oblong, permanent, the exterior wider, sheathing the interior: the corolla one-petalled, regular, superior: tube filiform, gradually enlarged, straight: border regular, bell-shaped, six-parted: divisions oblong, obtuse, equal, spreading: the stamina have three filaments, thread-subulate, inserted into the tube near the orifice, shorter than the corolla: anthers oblong, furrowed: the pistillum is an inferior, triangular germ: style simple, filiform, upright: stigmas three, filiform: the pericarpium is an ovate capsule, three-sided, obtuse, three-celled, three-valved: the seeds several, roundish, smooth.

The species cultivated are: 1. *I. Bulbocodium*, Crocus-leaved Ixia; 2. *I. Chinensis*, Chinese Ixia; 3. *I. rosea*, Rose-coloured Ixia; 4. *I. bulbifera*, Bulb-bearing Ixia; 5. *I. aristata*, Bearded Ixia; 6. *I. flexuosa*, Bending-stalked Ixia; 7. *I. polystachia*, Many-spiked Ixia; 8. *I. maculata*, Spotted Ixia; 9. *I. crocata*, Crocus-flowered Ixia.

The first has a roundish bulb, placed on the withered bulb, double the size of a pea, white, covered with a bay-coloured skin: the leaves three or four, in the flowering plant radical, in the fruiting cauline, spreading horizontally, half a foot or thereabouts in length, smooth, sharpish: the stem solitary, upright, two inches high, above the uppermost leaf, convex on one side, flat on the other; in the fruiting plant a little higher, in the cultivated one sometimes half a foot in height: the spathe terminating, two-valved: leaflets narrow-lanceolate, acute, concave, opposite; one upright, green, almost the length of the corolla; the other a little shorter, green on the back, but otherwise membranaceous and pellucid, patulous, whence the flower becomes as it were lateral. It is inodorous, and a native of Italy, flowering about the middle of April.

It varies with white and yellow flowers, with purplish and yellow flowers, with blue and white flowers, with white flowers, and with variegated flowers.

The second species has the scape round, fistulous, jointed, upright, simple at bottom, panicled-dichotomous or trichotomous at top, smooth, almost the thickness of a finger, two feet high: the leaves alternate, embracing, equitant, acute, entire, striated, smooth, the lower a little longer, about half the length of the stem, a span long and more: the flowers from the tips of the branches of the panicle, in umbels, from three to seven, peduncled: peduncles striated, one-flowered, an inch long: the spathe under the divisions and the umbel, withered. In India, the stalks rise to the height of five or six feet, but in this climate they are seldom more than half that height. The flowers are of a yellow colour within, and variegated with dark red spots; the outside is of an orange colour: these appear in July and August, and in warm seasons are succeeded by seeds. It is a native of the East Indies, &c.

The third has an ovate bulb, smooth, subtruncated: the scape three- (or four-) cornered, sheathed at bottom, branched, few-flowered, smooth, from a hand to a span in height: the leaves acute, grooved, smooth, the lowest, which is the longest, frequently double the length of the scape, or more, is lax and reflex; the two or three others are about the length of the scape, and upright: the flowers at the ends of the branches rather large, coming out one after the other: the outer spathe ovate, green; inner lanceolate, acute, membranaceous, sheathing the capsule.

It varies with the three inner segments of the corolla yellow, and the three outer green; with the three inner white-yellow, the three outer greenish; with the three inner blue-white, the three outer greenish; with the three inner white, the three outer green; with corollas wholly yellow; or wholly blue, or rose-coloured with a yellow base; also in the size of the flowers.

The fourth species has the scape simple or branched, somewhat compressed, striated, smooth, sheathed at bottom with leaves, from a hand to a foot in height: the leaves nerved and striated, distich, upright, smooth, a span long: the flowers three or more, large, with the rachis between the flowers flexuose: the spathe nerved and netted, gray, with a dusky tip: tube of the corolla only a line in length: border divided beyond the middle, but not to the tube: segments large, ovate-oblong, very blunt, spreading.

It varies with the corolla purple, red and white, yellow; with the scape very short and simple, higher and branched, and bulbiferous.

The fifth has a netted bulb, the size of a hazel nut: the scape simple, round, upright, smooth, from a hand to a foot in height and more: the leaves four or five, linear, five-nerved, the middle nerve and edges thicker, acute, upright, shorter by half than the scape: the flowers pointing one way (very seldom one only) on two branches, often from five to nine on a scarcely flexuose rachis: the spathes submembranaceous, awn-toothed: the corollas white flesh-coloured.

It varies with the segments of the borders of the corolla of a deep and elegant purple-violet colour within, three of them of the same colour on the outside, but the three others alternately of a pale dirty violet; one of these with two on the side of it has a double band in the throat meeting at one end; and, according to Mr. Salisbury, with whitish corollas, having a purple star, violet-coloured and yellow. In Miller's figures, with the corolla of a beautiful purple on the outside, but white within, and the stem terminated by two or three flowers; with the stalk terminated by two large flowers; the outside of a violet colour, edged with white, and the inside pale blue; and with one flower, and the corolla of a most beautiful purple colour both within and without.

The sixth species has a very small round bulb: the leaves three or four, long, slender, grass-

like, dark green: the stem very slender, round, a foot and half high: at the top the flowers are collected in a spike sitting close to the stalk, each having a thin, dry spathe, which covers the capsule after the flower is fallen. The corolla is pure white, and small.

The seventh species has a bulb the size of a hazel nut: the leaves three or four, many-nerved, upright, smooth, half the length of the scape: the scape round, smooth, upright, many-spiked, from a foot to two feet in height: the branches alternate, capillary, upright, a finger's length: the flowers on the scape and branches in spikes, on a flexuose rachis of a finger's length: the spathes submembranaceous and awned. The flowers appear in May.

It varies with the corollas yellow and violet, of one colour.

The eighth species has the bulb double the size of a hazel nut: the leaves three, four, or five, many-nerved, half the length of the scape: the scape usually simple, seldom many-spiked, round, upright, from a span to a foot high and more: branches filiform, upright, or spreading very much: flowers in terminating spikes, on a flexuose rachis: spathes membranaceous, gray at the base, brown at the tip, somewhat jagged: the corolla, above the mouth of the tube, has a dusky spot at the base of the border.

According to Miller, the stalk is slender, stiff, a foot and half long, naked to the top, where it is terminated by a round bunch of flowers, each inclosed in an oblong spathe, which is permanent, and splits open on one side: the flowers are on short peduncles, deep yellow with a dark-purple bottom. It flowers in May and June.

The ninth has the bulb a little larger than a hazel nut: the leaves about five, reflex-subfalcate, many-nerved, from an inch to a finger's length, half or one-third of the length of the scape: the scape simple, round, or branched, somewhat flatted, flexuose, upright, smooth, from a hand to a span in height: the branches spreading very much, naked, like the scape: the bractes gray at the base, ferruginous at the tip, slightly toothed and jagged: the flowers pointing one way, handsome, bell-shaped, with a short tube, orange-coloured with a paler hyaline or transparent mark above the mouth of the tube; seldom two, but most commonly five or seven. It is one of the handsomest of the Ixias, and like other sorts becomes handsomer and more branched by cultivation.

It varies with a short, simple, few-flowered scape, and a dark spot above the windowed or hyaline one, with a lofty, many-spiked, many-flowered scape, and with bright red flowers.

Culture.—These plants may be increased by seeds or off-sets.

The seeds of such sorts as can be procured should be sown in pots filled with light earth, in the spring, plunging them in a mild hot-bed. When the plants have attained some growth, they should be removed into separate pots of the same earth, being placed under the protection of a frame till they have taken root. They should be placed during the winter in a hot-bed frame. They may afterwards be removed into warm borders, being protected from frosts in the winter, and a few retained in pots under the frame, or in a dry stove.

They are three or four years in flowering when raised from seeds.

The common way is therefore to increase them by planting off-sets from the roots, which are afforded in great plenty; the proper season for this is in the early spring, before the shooting of the root, when the roots should be removed, and the off-sets taken off and planted out.

The old roots should not be removed oftener than every three years.

When the stems and leaves decay to the roots in the borders in autumn, they should be covered over with tan a few inches thick, to protect them from frost and the depredations of mice.

The hardy sorts serve to adorn the borders in the open ground, and the other tender sorts among other potted green-house plants, that require protection in winter.

IXORA, a genus containing plants of the flowering shrubby exotic kind.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Stellatæ*.

The characters are: that the calyx is a four-parted perianthium, very small, upright, permanent: the corolla one-petalled, funnel-form: tube cylindric, very long, slender: border four-parted, flat: divisions ovate: the stamina have four filaments, above the mouth of the corolla, very short: anthers oblong: the pistillum is a roundish, inferior, germ: style filiform, length of the tube: stigma two-cleft: the pericarpium a roundish berry, two-celled: the seeds by fours, convex on one side, cornered on the other.

The species cultivated are: 1. *I. coccinea*, Scarlet Ixora; 2. *I. alba*, White Ixora.

The first has a woody stem, five or six feet high, sending out many slender branches covered with a brown bark: the leaves opposite, or three or four at a joint: the flowers terminating in clusters; they have very long slender tubes, are cut into four ovate segments, and are of a deep red colour. It is a native of the East Indies.

rawn by Syd. Edwards London Published Sep 1st 180[illegible] by G. Kearsley Fleet Street Engraved by F. Sansom

1 *Ixia Chinensis*
Chinese Ixia

2 *Iberis Gibraltarica*
Gibraltar Candy Tuft

The second species has a woody stem, six or seven feet high, sending out weak branches: the leaves are opposite, sessile: the flowers terminating in small clusters; they have long slender tubes, divided into four segments at top, and are white, without scent. It is a native of the East Indies.

Culture.—These plants may be increased by seeds, when they can be procured from the countries where they grow naturally, as they do not perfect them in this climate. They should be sown in small pots as soon as they arrive, and be plunged into a hot-bed, when they arrive in autumn or winter seasons, the pots being plunged in the tan-bed in the stove; but when they come in the spring, it is best to plunge them in a tan-bed under frames. The seeds sometimes come up in about six weeks, if they are quite fresh; otherwise they lie in the ground four or five months, or longer. The earth should therefore not be thrown out of the pots till there are no hopes of their growing. When the plants come up, and are fit to remove, they should be each planted in a separate small pot, filled with light earth, being preserved in the green-house or stove.

They may also be increased by cuttings, which should be planted during the summer months, in small pots, and plunged into a moderate hot-bed, covering them close either with bell or hand glasses, to exclude the external air, shading them carefully from the sun in the heat of the day until they have put out good roots, when they should be parted, and each put into a separate pot, treating them as the seedling plants. Mr. Curtis thinks it probable, that these plants are less tender than is supposed.

They afford variety among other stove or green-house plants.

KADANAKU. See Aloe.

KÆMPFERIA, a genus containing plants of the herbaceous perennial flowery kind.

It belongs to the class and order *Monandria Monogynia*, and ranks in the natural order of *Scitamineæ*.

The characters are: that the calyx is a superior perianthium, obscure: the corolla is one-petalled: tube long, slender: border flat, six-parted: the three alternate divisions lanceolate, equal: the other two divisions ovate; the upper one two-parted: the divisions obcordate: all equal in length: the stamina have one membranaceous filament, subovate, emarginate: anther linear, doubled, entirely adnate, scarce emerging from the tube of the corolla: the pistillum is a roundish germ: style the length of the tube: stigma two-plated, roundish: the pericarpium is a roundish capsule, three-sided, three-celled, three-valved: the seeds are several.

The species cultivated are: 1. *K. Galanga*, Galangale; 2. *K. rotunda*, Round Kæmpferia.

The first is an annual, stemless, juicy plant: the root is bulbous, palmate, creeping, with ovate smooth lobes, and awl-shaped thick simple fibres: the leaves are broad-ovate, forming a ring next the ground, quite entire, smooth, with many longitudinal grooves, dark green, on short membranaceous, subterraneous petioles, embracing the inner ones: the flower radical, solitary, sessile, juicy, very white, with a large violet spot in the middle. It is a native of the East Indies.

The second has the roots somewhat like those of the first, but shorter, growing in large clusters, covered with an ash-coloured skin, but within white: from the roots arise the leaves, which fold over each other at their base: they are six or eight inches long, and three broad in the middle, gradually ending in acute points; the flowers arise immediately from the roots, each having a spatha at bottom cut into two segments, which closely embrace the foot-stalk: they have six petals, the three lower which decline downward are long and narrow, the two upper are divided so deeply as to appear like a flower with four petals, and the side petal is bifid: they are of mixed colours, blue, purple, white, and red, having a fragrant odour. It flowers in July and August, and is a native of the East Indies.

Culture.—These plants are increased by parting the roots, and planting them out in the spring, before they send forth new leaves, in pots of light rich mould; keeping them in the hot-house, giving water plentifully in the summer, but sparingly in the winter season.

They afford variety in stove collections.

KALE. See BRASSICA.

KALMIA, a genus containing plants of the hardy evergreen shrubby kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a five-parted perianthium, small, permanent: segments subovate, acute, rather columnar: the corolla one-petalled, salver-funnel-form: tube cylindric, longer than the calyx: border with a flat disk; the margin upright, half-five-cleft: ten nectariferous hornlets projecting outwardly from the corolla, and surrounding it where the border of it is upright: the stamina have ten awl-shaped filaments, upright-spreading, rather shorter than the corolla, inserted into the base of the corolla: anthers simple: the pistillum is a roundish germ: style thread-form, longer than the corolla, bent down: stigma obtuse: the pericarpium a capsule, subglobose, depressed, five-celled, five-valved, five-partite: the seed numerous.

The species cultivated are: 1. *K. latifolia*, Broad-leaved Kalmia; 2. *K. angustifolia*, Narrow-leaved Kalmia; 3. *K. glauca*, Glaucous Kalmia; 4. *K. hirsuta*, Hairy Kalmia.

The first rises with a branching stalk to the height of ten or twelve feet, with very stiff leaves, which are two inches long and one broad, of a lucid green on their upper side, but of a pale green on their under: they have short foot-stalks, and stand without order round the branches: between these the buds are formed for the next year's flowers, at the extremity of the branches; these buds swell during the autumn and spring months, till the beginning of June, when the flowers burst out from their empalements, forming a round bunch, or corymbus, sitting very close to the branch: they are of a pale blush colour, the outside of the petal a peach colour. In its native soil it continues flowering a great part of the summer, and is highly ornamental. It is a native of Carolina.

The noxious qualities of this elegant shrub lessen its value.

The second species rises from three to six feet high, dividing into small woody branches, which are very close, and covered with a dark-gray bark: the leaves are stiff, about two inches long, and half an inch broad, of a lucid green, placed without order upon the branches, on slender foot-stalks: the flowers are in loose bunches on the side of the branches, upon slender peduncles: they are bright red when they first open, but afterwards fade to a blush or peach-bloom colour.

There are varieties, with pale and deep-red flowers, differing in their habit: the latter, the most humble of the two, not only produces the most brilliant flowers, but in greater abundance. It is reputed poisonous to sheep and cattle in North America, where it is a native.

The third is much inferior in size to the first, rarely exceeding two feet in height. It is a native of Newfoundland, flowering in April and May.

The fourth species is usually in height from two to three feet, growing upright: the flowers are about the same size with those of the preceding, are of a purple colour, and grow in racemes: the stalk, leaves, and calyx are covered with strong hairs. It is a native of Carolina.

Culture.—These plants are increased by seeds, layers, and suckers.

The first sort is mostly raised from seeds procured from America, which should be sown in pots or boxes of light sandy mould, in the spring, plunging them in an easterly border, or in beds of light mould in the same aspect. When placed on a gentle hot-bed they succeed better. They must, however, be inured to the full air in summer, being sheltered during the winter from frost. When the plants have had two years' growth, they may be removed into separate pots, to be continued two or more years, when they may be planted out in the open ground in warm situations.

The second sort is mostly increased by layers, which should be made from the young shoots, and laid down in the early autumn. When they are well rooted, in a year or two, they may be taken off, and planted in pots separately filled with bog earth, or in a warm border of the same sort of earth. This is more hardy than the former.

The third sort is increased in the same way as the first, and requires similar management.

The fourth is preserved with difficulty in this climate, but may be raised by layers.

The most of the plants may likewise be increased by suckers, which should be taken off and planted in the spring, in nursery rows, for two or three years, when they may be removed to the places where they are to grow.

These plants, in the more hardy sorts, afford ornament and variety in the fronts of shrubbery borders and clumps; and in the more tender sorts, among other potted green-house plants.

KIDNEY-BEAN. See PHASEOLUS.

KIDNEY-BEAN TREE. See GLYCINE.

KIDNEY-VETCH. See ANTHYLLIS.

KIGGELARIA, a genus containing a plant of the evergreen shrubby kind.

It belongs to the class and order *Dioecia Decandria*, and ranks in the natural order of *Columniferæ*.

The characters are: that in the male the calyx

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1 *Kalmia glauca.*
Glaucous Kalmia

2 *Linum arboreum*
Tree Flax

is a one-leafed perianthium, five-parted, concave: divisions lanceolate, concave: the corolla has five lanceolate petals, concave, rather longer than the calyx, and forming with it a pitcher-shaped figure: nectary, glandules obtusely three-lobed; middle lobe largest, depressed, coloured, each growing to the claw of each petal: the stamina have ten filaments, very small: anthers oblong, shorter than the calyx, gaping at the tips with two holes: female, the calyx as in the male: the corolla as in the male: the pistillum is a roundish germ: styles five, simple: stigmas obtuse: the pericarpium is a leathery, globose capsule, rough, one-celled, five-valved: the seeds about eight, roundish, cornered on one side, covered by a proper coat.

The species cultivated is *K. Africana*, African Kiggelaria.

It is a tree exceeding the height of a man, with the trunk and branches gray: the leaves are alternate, lanceolate, petioled, smooth, stiff, and straight, sharply serrate, acute, spreading: the petioles roundish, without stipules, one eighth of the length of the leaves: at the back of the leaf, where the larger lateral vessels come out, in the sinus or axil, there is a slight pubescence with a cavity, which forms a prominence on the upper surface of the leaf. On the male plant, one or two branched peduncles bear several flowers, nodding, in a panicle; the petals are white, and the nectaries yellow. The female produces a single flower on a simple peduncle: the fruit is a globular, rugged, one-celled, berried capsule, with a thick coriaceous rind, pubescent on the outside, and rugged, with granular atoms. It grows naturally at the Cape of Good Hope, where it rises to be a tree of middling stature; but it does not grow to a great magnitude in this climate.

Culture.—The plants may be increased by seeds, layers, and cuttings; but the first is the best method, as they root sparingly by layers and cuttings.

The seeds should be sown in the early autumn, in pots filled with fresh loamy earth, plunging them in a hot-bed. When they have a few inches growth, they should be removed into separate small pots, replunging them in the hot-bed; and when well rooted they should be gradually hardened to the open air.

The layers should be made from the young shoots of the same year, laying them down in the summer.

The cuttings of the young shoots should be planted in the spring, immediately before the plants begin to shoot, in pots filled with soft loamy earth, being plunged in a very moderate hot-bed, and covered with glasses, to exclude the air; due shade being afforded, and little water given after the first planting. Such as strike root may be removed into separate small pots of loamy earth, and be exposed to the air in a warm sheltered situation, till the autumn, when they should be placed under the protection of the green-house, and managed in the same way as trees of the Orange kind.

They afford variety among potted plants of the green-house kind.

KING'S SPEAR. See ASPHODELUS.

KITCHEN-GARDEN, that sort of Garden which is principally destined to the growth of different sorts of culinary vegetables and roots.

The land designed for this sort of garden should be sufficiently spacious, of a good depth and quality of mould, dry, and at the same time well situated for warmth, and the influence of the sun. See GARDEN.

KITCHEN-GARDEN PLANTS, all such plants as are cultivated for the purpose of food.

NAMES AND SORTS.	MODES OF CULTURE.
Agaricus campestris, the field agaric or mushroom.	By the spawn of the root, or invisible seed, running in lumps of earth or dung, in the autumn.
Allium, garlick, onion, leek, &c. Of the first kind, large white garlick—red garlick.	By the cloves of the root.
In the second, or rocambole.	By the root and bulbs from the stalk.
In the third or onion, common oval Strasburgh onion—great oval Portugal onion—flat white Spanish onion—flat red Spanish onion—silver-skinned onion—bulbless-rooted Welch onion.	By seed annually, which should be sown at different times in the early spring months.
In the fourth, chives, or cives.	By dividing the roots, and planting them out in spring.
In the fifth, escalot, or shallot.	By offsets of the root, planted out in spring.
In the sixth, or Canada tree-onion.	By offset bulbs of the root, and the bulbs at top of the stalk, planted out in spring.
In the seventh, or the leek, broad-leaved London leek—narrow-leaved leek.	By seed annually, which should be sown in the early spring.

Names and Sorts.	Modes of Culture.
Anethum, dill, &c., common dill.	By seed annually, sown in the spring.
Fennel—light-green-leaved—dark-green fennel—sweet-seeded fennel.	By seed sown in spring; also by slipping the old roots, and planting them out in the autumn.
Italian fennel.	By seed annually, sown in the spring.
Angelica savita, common angelica.	By seed annually, sown in spring.
Apium, parsley, celery, &c., parsley—common plane-leaved parsley—curled-leaved common parsley—broad-leaved, or large-rooted parsley.	By seed sown in spring.
Celery—common upright celery—upright celery with solid stalks—turnip-rooted spreading celery.	By seed sown in the spring, for transplanting in summer and autumn.
Asparagus officinalis, common asparagus.	By seed sown in the autumn; and when once raised, the roots abide for some years.
Atriplex hortensis, garden orach—white-leaved garden orach—green orach—purple orach.	By seed annually, sown in the spring.
Beta vulgaris, beet—common culinary beet—green-leaved culinary beet—white beet—chard, or great white Swiss beet—mangel wurzel beet.	By seed annually, sown in the spring months.
Red beet—large, long red-rooted beet—turnip-rooted red beet—red-rooted beet with green leaves—pale-red beet.	By seed annually, sown in the early spring.
Borago, borage.	By seed annually, sown in autumn or spring.
Brassica, the cabbage, cauliflower, broccoli, turnip, &c., the cabbage—small early summer cabbage—dwarf early sugar-loaf-shaped cabbage—large, hollow, sugar-loaf cabbage—early Russia cabbage—common round white cabbage—long-sided hollow cabbage—oval hollow cabbage—flat-topped cabbage—musk-scented cabbage—giant cabbage—red cabbage.	By seed annually, sown at different times in spring and autumn, for use all the year, by having the plants set out at various times.
Savoy cabbage—common green curled Savoy—large green Dutch Savoy—yellow Savoy.	By seed annually, sown in spring, for autumn and winter use.
Laciniated, and other open-leaved cole—green curled borecole—red curled borecole—thick-leaved curled borecole—finely fringed borecole—broad, erect, curled-leaved Siberian borecole, or Scotch cole, or kale, red and green—common plane-leaved green colewort.	By seed annually, sown in spring and summer, for plants for autumn and winter use.
Turnip cabbage—turnip cabbage with the turnip above ground—with the turnip under ground.	By seed, sown annually in spring and summer.
The cauliflower—early cauliflower—late cauliflower.	By seed sown annually, in spring and autumn, for plants for summer and autumn use.
Italian *brassica,* or broccoli—early purple broccoli—late large purple broccoli, comprehending varieties, with blue, brown, green, and yellowish heads—dwarf purple broccoli—white or cauliflower-broccoli—black broccoli.	By seed, sown in spring and beginning of summer, for plants for autumn, winter, and spring use.
The turnip—early Dutch turnip—white round turnip—green-topped turnip—red-topped turnip—yellow turnip—oblong white turnip—long white-rooted French turnip—round purple French turnip.	By seed sown in spring and summer, for plants for use most part of the year.
Calendula officinalis, common marigold.	By seed sown annually, in spring, summer, or autumn.
Cichorium endivia, endive—green curled endive—white curled endive—broad-leaved Batavian endive.	By seed sown annually, in summer, from May till July, for plants for autumn and winter use.

Names and Sorts.	Modes of Culture.
Cochlearia armoracia, horse-radish.	By pieces of the roots planted out in spring, for use most part of the year.
Crambe, sea-cabbage or colewort—the different varieties.	By seed sown in spring; but when once raised, the roots remain for years, sending up shoots for use in spring and summer.
Cucumis, cucumber and melon—the cucumber—early short prickly cucumber—early cluster-cucumber—long, green, prickly cucumber—long, white, prickly cucumber—long, smooth, green, Turkey cucumber—large, smooth, white cucumber—large, smooth, green, Roman cucumber.	By seed sown annually, at different times, on hot-beds, in the early spring and summer.
The melon—Romana melon—Cantaleupe melon; varieties of each; and several other sorts.	By seed sown annually, at different times, on hot-beds, in the spring months.
Cucurbita, the gourd and water melon.	By seed sown annually, in the spring season.
Cynara, artichoke and cardoon—the common artichoke—globular-headed, red Dutch artichoke—oval-headed, green French artichoke.	By suckers from the sides of the old plants, in spring, of many years' duration.
The common cardoon.	By seeds sown annually, in the early spring.
Daucus carota, the carrot—orange-coloured carrot—red carrot—yellow carrot—white carrot.	By seed sown annually, in spring, summer, and autumn, for use most part of the year.
Helianthus tuberosus, tuberous sun-flower, or Jerusalem artichoke.	By pieces of the root planted annually, in the spring season.
Hyssopus officinalis, common hyssop—the several different varieties.	By seed sown in spring, and by planting slips and cuttings of its branches.
Lactuca, lettuce—early green cabbage-lettuce—white cabbage-lettuce—brown Dutch cabbage-lettuce—great admirable cabbage-lettuce—green and white ball-cabbage-lettuce—green cos-lettuce—white cos-lettuce—black cos-lettuce—spotted Aleppo cos-lettuce—brown Cilicia lettuce—imperial lettuce—red capuchin lettuce—green capuchin lettuce—curled lettuce.	By seed sown annually, at different times, in spring, summer, and autumn, for plants for setting out for use most part of the year.
Lavandula, lavender—spike-flowered common lavender—common narrow-leaved—broad-leaved—blue-flowered—white-flowered—and dwarf lavender.	By slips planted out in spring, which are of many years' continuance.
Stœchas, or French lavender.	
Lepidium sativum, garden-cress—common small-leaved—broad-leaved—curled-leaved.	By planting slips or cuttings, and by seed, which are of many years' duration.
Melissa officinalis, balm—common balm.	By sowing seed at different times of the year, according as the plants are wanted.
Mentha, mint, penny-royal, &c. green common spearmint—curled-leaved spearmint—variegated spearmint.	By dividing and planting the roots in spring or autumn, which are of many years' duration.
Peppermint.	By dividing the roots, by young plants, and by cuttings of the stalks, planted out in spring, and which continue many years.
Penny-royal.	By roots and plants, &c. like the former.
Ocymum Basilicum, basil—common sweet basil—several varieties.	By dividing and slipping the plants, as for the mint, and planting them out.
Origanum, marjoram—common, wild, perennial pot marjoram—winter perennial sweet-marjoram—marjorana, or annual sweet-marjoram.	By seed sown in spring, on a hot-bed, the plants being afterwards planted out.
	By sowing seeds in spring, and the two former also by slipping the roots, and planting them.

Names and Sorts.	Modes of Culture.
Pastinaca sativa, parsnep—common garden parsnep.	By seed sown annually, in spring, for winter use.
Phaseolus vulgaris, common kidney-bean—dwarfs and runners. Dwarf kinds—early white—early yellow—liver-coloured—speckled dwarf—Canterbury white dwarf—Battersea white dwarf—large white dwarf—cream-coloured dwarf—black dwarf—sparrow-egg dwarf—amber-speckled dwarf.	By seed sown annually, at different times from April till July or the following month.
Running kinds—scarlet runner—white variety—large Dutch runner—Battersea white runner—negro runner—variable runner.	By sowing the seed like the former, but principally in the summer months.
Pisum, the pea—Charlton pea—golden Charlton—earliest golden Charlton—long Reading hotspur—Masters' hotspur—Spanish morotto—green nonpareil—early dwarf marrowfat—large marrowfat—green rouncival, or union—white rouncival—Ledman's dwarf pea—small sugar pea—large sugar pea—cluster pea—crown pea—egg-pea—sickle pea, &c.	By seed sown annually, at different times from October till June, but principally in the early spring months.
Portulaca oleracea, purslane—green purslane—golden purslane.	By seed sown at different times in April and May.
Poterium Sanguisorba, burnet—common garden burnet.	By seed sown in autumn or spring, and parting the roots.
Raphanus sativus, the radish—short-topped early radish—long-topped radish—deep-red radish—pale-red, transparent, mild radish—salmon-coloured radish—small white turnip-rooted radish—small red turnip radish—large, white, turnip-rooted Spanish radish—large, black, turnip-rooted Spanish radish.	By seed sown at different times from Christmas till July or August; but the latter sorts sown principally in June and July, for autumn and winter use.
Rosmarinus, rosemary—some varieties.	By planting layers, slips, and cuttings, in spring.
Rumex acetosa, sorrel—common long-leaved sorrel—round-leaved French sorrel—barren sorrel.	By parting the roots, and the first sort also plentifully by seed.
Ruta graveolens, rue; several varieties.	By planting slips and cuttings; also by seed.
Salvia, sage, clary, &c. The sorts are—common sage—red sage—broad-leaved green sage—narrow-leaved green sage—broad-leaved hoary sage—sage of virtue—wormwood sage, &c.	By planting slips, in April, May, and June; also by sowing the seed in the spring season.
Clary.	By seed sown annually in the spring.
Satureja, savory—winter perennial savory—summer annual savory.	Both by seed sown in the spring season, and the former also by planting slips.
Scandix Cerefolium, chervil—annual garden chervil.	By seed annually, in August, for winter and spring use, or sown also in spring and summer, for succession crops.
Scorzonera, scorzonera—Spanish scorzonera.	An eatable root, raised from seed sown in spring.
Sinapis, mustard—white mustard—black mustard—field or wild mustard; the former to use young in sallad, and the two last for their seeds, to make the table sauce called mustard.	By seed in spring; or, if for sallads, at any time of the year.
Sium sisarum, sisarum or skirret.	An eatable root, raised by planting offsets commonly, of the root, also by seeds.
Smyrnium Olusatrum, Alisanders, or common Alexanders.	By seed annually in spring.

Names and Sorts.	Modes of Culture.
Solanum, night-shade, furnishing the potatoe and tomatoe—tuberous-rooted solanum, or potatoe—the common round red potatoe—early round red—oblong red—deep red—pale red—rough red—white kidney-shaped—large red-ended kidney—white round—white cluster—prolific American.	By planting pieces of the roots, or the roots whole, in spring; also by sowing seed occasionally to obtain new varieties.
Tomatoe, or love-apple; varieties.	By sowing the seed annually, on a hot-bed, in the spring.
Spinacia, spinach—round, thick-leaved, or smooth-seeded—triangular-leaved, or prickly-seeded; the former for spring and summer crops, the latter to stand the winter.	By sowing seed annually, in spring, summer, and autumn, for use most part of the year.
Tanacetum vulgare, common tansey.	By parting the roots, and planting in spring or autumn.
Thymus vulgaris, common thyme—the varieties with broad leaves—with narrow leaves—with striped leaves.	By sowing seeds in March and April; also by planting slips of the root and branches, and by cuttings; but seed is the only way to raise a quantity of the common sort; and the other methods to continue the varieties, or for a general supply.
Tragopogon porrifolium, salsafy.	An esculent root, by seeds annually in spring.
Tropæolum, Indian Cress, or nasturtium—nasturtium minus—nasturtium majus; their flowers for garnish and sallads, and their seeds to pickle.	Raised annually from seeds, sown at different times in spring.
Valeriana Locusta, corn-sallad, or lamb's-lettuce.	By seed sown in spring and autumn.
Vicia Faba, the bean—early Mazagan—early Lisbon—long-pod—Turkey long-pod—toker bean—Sandwich bean—Windsor bean—white-blossomed—red-blossomed—Spanish bean—nonpareil bean—dwarf fan bean, very low.	By seed sown annually, at different times from October until June, but principally in the early spring months.

See the different Genera.

KNAUTIA, a genus containing plants of the herbaceous, annual, and biennial kind.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Aggregatæ*.

The characters are: that the calyx is a common perianthium, containing the floscules disposed in a simple orb, simple, cylindric, oblong, upright: divisions awl-shaped, approximated, of the number of the floscules: perianthium proper, very small, crowning the germ, quite entire, coriaceous, pervious at top: the corolla is universal, equal: proper one-petalled, unequal: tube the length of the calyx: border unequal, four-cleft; the exterior segment larger and ovate: the stamina have four filaments, longer than the tube of the corolla, inserted into the receptacle: anthers oblong, incumbent: the pistillum is an inferior germ: style filiform, length of the stamens: stigma thickish, two-cleft: there is no pericarpium: the seeds solitary, four-sided, crowned with the down, and covered with the proper involucre of the flower: the receptacle common, scarcely remarkable, flat, naked.

The species cultivated are: 1. *K. Orientalis*, Oriental Knautia; 2. *K. Propontica*, Levant Knautia.

The first rises with an upright branching stalk four feet high: the branches terminated by single pedunclcs, each supporting one flower, with the florets of a bright-red colour: the leaves on the middle of the stem are pinnatifid; the rest only serrate: the flowers radiate, with five florets (four). It is annual, and a native of the Levant, flowering from June to September.

The second has the stem biennial, the thickness of a finger, two feet high, villose: the leaves somewhat hairy, rugged, and serrate, except the upper ones, which are quite entire, and a span long: the calyxes oblong, cylindrical, consisting of eight or ten lanceolate leaflets, awl-shaped at the tip: corollas not longer than the calyx, four-cleft; the marginal ones larger, with the outer segment larger, purple: middle corollets often four, smaller, less irregular: anthers pur-

ple: the filaments and pistils are white. Found in the Levant.

Culture.—These plants may be easily increased by seeds, which, when permitted to scatter in the autumn, produce good plants. They may afterwards be taken up, and planted in the borders of pleasure-grounds, among low shrubs near the walks. The plants in this way live through the winter, and flower in June. There is no culture required but to keep the plants clean from weeds. The seeds fall as soon as they are ripe.

They afford variety among other hardy flowering plants of similar growths.

KNEE-HOLLY. See RUSCUS.

KNOT-GRASS. See ILLECEBRUM.

LABRADOR TEA. See LEDUM.

LABURNUM. See CYTISUS.

LABYRINTH, a sort of maze or wilderness plantation, abounding with hedges and walks, distributed into many windings and intricate turnings, leading to one common centre, extremely difficult to be found out, designed by way of amusement.

It is commonly formed with hedges, in double rows, leading in various twistings and turnings, backward and forward, with intervening plantations and gravel-walks alternately between hedge and hedge. The great object is to have the walk contrived in so many mazy intricate windings, as to cause much labour and difficulty to find out the centre, by meeting with frequent stops and disappointments, as the hedges must not be crossed or broken through. In a well-contrived Labyrinth a stranger often entirely loses himself, so as neither to find his way to the centre, or out again the way he came in.

They are now, however, rarely introduced in modern garden designs; and scarce to be seen, except in some old gardens.

The hedges for this use are usually of hornbeam, but may be of beech, elm, or any other sort that can be kept in neat order by clipping. The walks should be five feet wide at least, laid with gravel, and neatly rolled; and the trees and shrubs to form the thicket of wood between the hedges of any of the hardy kinds of the deciduous tribe, interspersed with some evergreens. In the middle, a space should be left open as the centre.

Small Labyrinths are occasionally formed with box edgings, and borders for plants, and alleys for walking in, in imitation of the large ones, and which have a good effect in small garden-grounds.

LAC, or GUM LAC. See CROTON.

LACE-BARK. See DAPHNE.

LACHENALIA, a genus containing plants of the bulbous-rooted kinds.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Coronariæ*.

The characters are: that there is no calyx: the corolla has six petals, erected into a tube, oblong, connate at the base, unequal: the three exterior ones shorter, often callous at the tip: the stamina have six awl-shaped, upright filaments, growing to the base of the petals, and of the same length with them: anthers oblong: the pistillum is a superior subovate germ: style awl-shaped, length of the stamens: stigma simple: the pericarpium is a subovate capsule, three-winged, three-celled: the seeds several, globose, affixed to the receptacle.

The species cultivated are: 1. *L. orchioides*, Spotted-leaved Lachenalia; 2. *L. pallida*, Pale-flowered Lachenalia; 3. *L. tricolor*, Three-coloured Lachenalia.

The first has a roundish, whitish bulb: the whole of the plant is smooth: the leaves usually two from the bulb, from six inches to a foot in length, one always much narrower than the other, sharpish, thick, spreading at top, flattish, sheathing and channelled at bottom, rough and cartilaginous at the edge, dirty green, marked with lines on the inside, and having dusky spots scattered over them: the scape round, upright, pale green with dusky spots, commonly longer than the leaves: the bractes lanceolate, acuminate, concave at the base, spreading very much, white: the flowers are almost upright; the upper ones in the spike abortive. It is a native of the Cape.

In the second species the bulb is roundish, flatted a little, the size of a hazel nut: the root-leaves two, a foot long and more, acute, channelled, and sheathing at bottom, flat at top, linear-lanceolate, almost equal in length, one

near an inch in width, the other much narrower, deep green on both sides, unspotted, shining, quite entire, and not rough about the edge: the scape round, shining, pale green, unspotted, almost upright, weak: the raceme upright, three inches long, with about twenty flowers, somewhat remote, and inodorous: the bractes sessile, concave, acuminate, whitish: the pedicels one-flowered, round, almost upright, the length of the bractes at least: petals whitish, the three outer wholly green above the middle, the inner marked there only with a green line. It is a native of the Cape.

In the third the leaves two, radical, lanceolate, like those of the common white lily, thin, not fleshy, dusky-spotted on the upper surface: the scape round, like that of the garden hyacinth, scarcely a foot high, dusky-spotted: the flowers alternate: the petals lanceolate, unequal; the three outer fastened to the inner ones, which do not at all cohere at the base: the filaments declining, inserted into the receptacle: the anthers blood-red: stigma white: the stem is almost comose, with abundance of awl-shaped bractes that spring out below the upper rudiments of the flowers.

It varies with yellow, saffron-coloured, blood-red purple at the tip, and greenish yellow corollas; also in the proportion between the inner and outer petals; and in the breadth of the leaves. It is a native of the Cape.

Culture.—These plants may be increased by offsets from the bulbs, and by seeds, when they are produced.

The offsets should be planted out in pots of light fresh earth, when the bulbs are in a state of inactivity of growth, placing them in a warm border to be covered with hand glasses, or, what is better, in a dry stove or green-house.

They bear forcing tolerably, and their flowering is much promoted by being preserved in the warmth of the stove.

They afford variety among collections of potted bulbous-rooted flowering plants.

LACTUCA, a genus containing a plant of the herbaceous annual kind.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Compositæ Semiflosculosæ*.

The characters are: that the calyx is common, imbricated, cylindric: scales very many, sharp, membranaceous on the margin: the corolla compound, imbricated, uniform: corollets hermaphrodite, very many, equal: proper one-petalled, ligulate, truncated, four- or five-toothed: the stamina have five capillary filaments, very short: anther cylindric, tubular: the pistillum is a subovate germ: style filiform, length of the stamens: stigmas two, reflex: there is no pericarpium: calyx converging, ovate-cylindric: the seeds solitary, ovate, acuminate, even, compressed: down capillary, on a long stipe attenuated below: the receptacle naked.

The species is *L. sativa*, Common Garden Lettuce.

It has the leaves large, milky, frequently wrinkled, usually pale green, but varying much in colour, form, &c. in the different varieties: the stem strong, round, two feet or three quarters of a yard in height, bearing abundance of small yellow flowers. Its native place is unknown; and it is not improbable but that it may be improved by cultivation from one of the wild sorts.

There are several varieties cultivated: the principal of which are, of the Cabbage Lettuce kind, the Hardy Green, White Honey, Great Admirable White, Brown Dutch, Small Early, White Ball, Green Ball; and of the Coss Lettuce kind, the Green Coss, White Coss, Egyptian Coss, Spotted Coss, Black Coss, Brown Cilicia, Green Cilicia, Red Capuchin, Green Capuchin, Large Imperial, the Roman, the Prince: but the three or four first of the different sorts are the most valuable, and it is of much consequence to have the best kinds.

Culture.—This species, and all the varieties, are raised by sowing the seed annually, at different times, as in February and the three following months, for the summer supply of plants; and in August and the following month, for the autumn, winter, and very early spring supplies.

These different sowings should be performed upon beds of fine light dry earth, in an open situation, and exposed to the sun. Some of the late sowings may be made under hand glasses, or in frames or boxes, in order to have the young plants protected from frosts. Each of the varieties or sorts should be sown separately, and distinct from the others, and be slightly raked in.

It is sometimes the practice to sow them among other low growing crops, such as radishes, spinach, onions, &c. to save ground; but this should always be avoided as much as possible, as a very small portion of land is sufficient for raising large supplies of plants.

For the very early spring use, as open Lettuces, the early white cabbage sorts are the most proper; but for the main crops, to remain for full growth, the principal sorts of the Coss and Cabbage kinds must be employed.

When the plants appear, they must be kept perfectly free from weeds, and properly thinned. As they attain a proper growth, as three or four inches in height, some of the different sorts

must be planted out into beds in the open ground, drawing them up carefully, and planting them immediately. This work should be performed by a line and small dibble, in rows, a foot or more distant, with the same space from plant to plant. The quincunx mode is mostly adopted, which affords the most room, and at the same time has the neatest appearance. As soon as the planting is finished, the whole should be well watered; and when the weather is dry, repeated once or twice.

By thus planting out the several sorts at different times, at the distance of three weeks or a month, from the early spring till the latter end of the autumn, due successions of good Lettuces may be provided.

In the summer plantings out, when the weather proves very dry, it is sometimes the practice to plant them in small drills, in order to preserve the moisture more effectually.

After the beds of the different principal sowings have been considerably thinned by the several transplantations that have been made from them, the plants that remain may be set out to proper distances by the hoe, and left to take their full growth.

When the plants of the main spring and summer crops have attained a pretty full growth, especially those of the Coss kinds, it is necessary to tie the leaves of them up with bass pretty close, when the plants are quite dry, in order to blanch the inner parts, and render them perfectly crisp and tender.

Culture in the winter and very early spring crops.—For this purpose some seed of the Hardy Green and White Cabbage sorts, and the Brown Dutch, and White and Green Coss kinds should be sown about the middle of August, and beginning of September, in open situations, when the plants will come up in a week or ten days, and about the end of September; and in October, a parcel of the best plants of each sowing should be planted out in a warm dry situation, five or six inches asunder; and at the latter period some in shallow frames, to be covered with glasses on cold nights, and in bad weather; or under hand-glasses, or in a bed arched over with hoops or rods, to be covered with mats in winter frosts.

Under either of the above shelters the plants should have the free air in mild dry weather, covering them in cold nights with proper covers, especially after this month; also in all very cold, and in very wet weather, day or night, particularly those in the frames and under glasses; and those in hand-glasses may have the glasses almost constantly over them in winter, tilting up one side in mild weather, only setting them entirely off in fine mild dry days; but in sharp frosty weather keeping those under every kind of shelter quite close; allowing also additional covering of mats or litter, when the frost is very intense. Those in the borders may be defended by some light litter; but the covering should never be suffered to remain longer on any of the crops than the bad weather continues, the free air being admitted every mild day.

In this method Lettuces may be had the greatest part of winter and early in spring, particularly the Cabbage sorts: those planted out first will be fit for use in November and December, and the second plantings come in towards Christmas, and, being sheltered by the glasses, continue coming in for use till succeeded by the other latter autumn sowings; being careful that, as any are gathered out of the frames or glasses, others be removed from the borders to fill up the vacancies, whereby the glasses may be constantly supplied during the winter season.

It is sometimes the practice where Lettuces are intended to be planted in frames late in autumn, for winter use, to have a moderate hotbed made for their reception, in order that they may be well forwarded in the beginning of winter; and if the heat is continued moderately by aid of linings, allowing plenty of air in mild weather, the plants may be very fine by Christmas or a little after.

Culture in the winter standing spring crops.—In order to have good Lettuces for spring use, some seed should be sown toward the middle and latter end of August, for the plants to stand the winter, some where sown, others transplanted into warm borders, to stand without any other shelter than that of the walls or other fences; and another sowing should be performed about the middle of September, to provide plants for pricking out under frames, to have the shelter of the glasses all winter, as a reserve in case those in the borders are destroyed: where both stand, one may succeed the other as crops.

In the first case a quantity of the best plants, when two or three inches high, should be planted out towards the latter end of October, into a south border, under a wall, &c. and in some other warm dry situation, in rows six inches asunder, and four inches in the rows; or some close under a south wall, or other fence, in a foot-wide space all the way along, pricking them therein four or six inches distant; as they will have a better chance of standing the winter than those situated more distant from the shelter of the wall. In each method the plants are to remain to take their chance all winter: out of the whole many of them will probably escape

the frost; but in very severe weather they may be protected by a light covering of dry long litter, which should be removed again in due time when the frost breaks. In March or April, if they remain too thick, some should be thinned out and planted in another place, in rows twelve or fifteen inches asunder: the crops thus wintered in the open ground, come in for use in April and May, to succeed those sown in autumn, and sheltered occasionally all winter, and will remain good till the spring sown plants are ready for use.

In the latter case, or those sown in September, to be wintered in frames, they should be planted about the latter end of October, or beginning of the following month, in rows, from the back to the front of the frame, three inches distant, closing the earth well about each plant, finishing with a moderate watering all over the plants, and putting on the glasses to promote their more speedy rooting afresh, shoving the lights, however, two or three inches down, to give vent to the moist vapour arising from the mould; but when the plants have taken fresh root, and are set to growing, the full air should be admitted every mild dry day, by taking the glasses entirely off, which must be continued throughout the winter season, in all dry mild weather, but putting them on every night in cold or very wet weather; also in the day-time when great rains prevail; and in frosty weather keeping the glasses always on, except in the middle of sunny days, and when the frost is but slight; using also other coverings of mats or long litter over the glasses, and around the sides of the frame, when the frosts are very severe; during the winter keeping all decayed leaves clean picked off; and as the spring and warm weather advance, letting them have the benefit of warm showers. In this way they may be effectually preserved, if those in the open ground should be destroyed by the frost or excessive moisture. About March some of them should be transplanted into the open ground, in rows, a foot asunder, watering them moderately till fresh rooted; leaving a crop remaining in the frames or winter-bed, a foot apart, to stand to cabbage; which will arrive to perfection a considerable time before the transplanted ones, and those that have been fully exposed all winter, are ready. Where frames cannot be spared, a quantity of the plants may be pricked out under hand- or bell-glasses in autumn, to stand the winter, either by themselves for a full crop, or some under the hand- or bell-glasses, that are placed over early cauliflowers, as practised by the London gardeners, planting them round just within the glasses, and managing them as directed for those in the frames; or for want either of a sufficiency of frames or hand-glasses, a quantity may be planted out in October, in four-feet wide beds, in a warm situation, arched over with hoops or rods, to cover with mats and litter in bad weather. In this way they have a better chance of surviving the winter than those fully exposed; and in spring transplanting a quantity, by way of thinning, into other beds, as directed above.

Saving seed.—For this purpose some of the best cabbaged early plants of all the sorts should be chosen, as those of the latter crops rarely run soon enough to ripen seeds perfectly before they are attacked by the autumnal rains and cold, which greatly retard the ripening of the seed.

It is likewise of importance to have the different varieties intended for seed at some distance from each other, as when too near together, the farina of the different sorts may mix and fecundate one another, and thereby degenerate plants be produced.

The seed usually ripens in August and September, but that of different plants rarely equally together; so that, as it arrives to perfection, the respective stems, &c. of ripe seed should be pulled up or cut off in dry days, and spread upon a cloth, or tied in small bunches, and hung up across lines in a dry airy place for a week or two, for the seeds to become dry and harden; then beaten or rubbed out, and cleaned from the down and other rubbish, and exposed upon cloths a few days to dry for keeping; being afterwards put up in bags for use, and hung in a dry room.

These plants may in general be considered as annuals and biennials; as those sown in spring and summer attain perfection, run up to seed, and perish the same year; while the autumn sowings stand all winter until the spring following, when they attain perfection, shoot up to seed, and perish root and branch. All the sorts are sufficiently hardy to grow in any good dry common soil, in a free situation open to the sun and air.

The use of these plants is principally in sallads, when arrived at full growth and cabbaged, that the inner leaves become blanched, crisp, and sweet; and sometimes also the young open plants of the Cabbage Lettuce sorts are used in winter and spring, till the other general crops arrive at perfection. Young open Lettuces are also often used as small sallad herbs, sowing them thick in rows, like cresses, &c. and gathering them in the same manner; but this mode is more particularly practised in winter and early spring. They, however, in general, do not eat any way so crisp, sweet, and palatable as when fully cab-

baged. The fully cabbaged Lettuces are also excellent for stewing and for soups, as well as many other purposes.

LADANUM. See CISTUS.

LADIES' BOWER. See CLEMATIS.

LADIES' MANTLE. See ALCHEMILLA.

LADIES' SLIPPER. See CYPRIPEDIUM.

LAGERSTROEMIA, a genus containing a plant of the exotic tree kind, for the green-house.

It belongs to the class and order *Icosandria Monogynia*, and ranks in the natural order of *Salicariæ*.

The characters are: that the calyx is a one-leafed, six-cleft, bell-shaped perianthium, rather acute, smooth, permanent: the corolla has six ovate, obtuse petals, crisped, undulated, contorted: claws filiform, longer than the calyx, inserted into the receptacle: the stamina have very many filiform filaments, longer than the calyx, inserted into the calyx below the germ: the six exterior ones are twice the thickness of the rest, and are longer than the petals: anthers oval, incumbent: the pistillum is a subglobose germ: style filiform, length of the longer stamens: stigma simple: the pericarpium is a subglobose capsule, crowned with the style on its bluntish top, six-furrowed, six-celled, six-valved, the dissepiments coalescing with the sutures: the seed several, ovate, awl-shaped at the base, compressed, adhering to a central hexagonal pillar.

The species cultivated is *L. Indica*.

It has the trunk about a fathom high, or somewhat more, smooth all over: the branches alternate, somewhat angular, flexuose, rigid, spreading: the branchlets four-cornered: the leaves alternate, subsessile, on the twigs ovate, on the branches oblong, obtuse, entire, nerved, stiffish, from half an inch to an inch in length: the flowers in a decompound, trichotomous, naked, spreading panicle at the ends of the twigs. It is a native of the East Indies, &c. flowering from August to October.

Culture.—This plant is capable of being increased either by layers or cuttings of the young branches.

The layers should be made from the young shoots of the preceding summer, and be laid down in the autumn. When they are well rooted in the succeeding autumn, they should be taken off and planted out in separate pots.

The slips or cuttings should be made from shoots of the same year's growth, and be planted out early in the summer, in pots of light earth, being plunged in a bark hot-bed, and covered with small bell hand-glasses, due shade and water being given. When well rooted in the spring following, they may be taken up and planted in separate pots, filled with light mould, being afterwards managed as other green-house plants.

They afford variety in collections of potted plants.

LAGOECIA, a genus containing a plant of the herbaceous kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Umbellatæ* or *Umbelliferæ*.

The characters are: that the calyx is an universal involucre, eight-leaved: leaflets feather-toothed, ciliated, reflex, containing the umbellule: involucre proper four-leaved: leaflets hair-feathered, involving a single footstalk shorter than the leaflet itself: perianthium proper five-leaved, hair many-cleft, superior: the corolla has five two-horned petals, shorter than the calyx: the stamina have five capillary filaments, length of the corolla: anthers roundish: the pistillum is a roundish germ, below the receptacle of the perianthium: style length of stamens: stigmas two, the one truncated: there is no pericarpium: the seeds solitary, ovate-oblong, crowned by the perianthium.

The species is *L. cuminoides*, Wild or Bastard Cumin.

It is an annual plant, about a foot high: the leaves resemble those of Honeywort: the flowers are collected into spherical heads at the extremity of the stalks, and are of a greenish yellow colour: the fruit is small, pedicelled, ovate-acuminate, crowned with a ciliate calyx, villose, one seed only ripening, the other abortive, and fixed laterally to the apex of the other, like a withered scalelet: the fertile seed is of a dusky black colour, sprinkled all over with hoary villose hairs, convex on one side, with five capillary raised whitish streaks, flattish on the other, with three very slender streaks, marking out the place of the abortive seed, which is constantly and easily found when the fruit is well softened in water. It is a native of the Levant, flowering in June and July.

Culture.—These plants may be increased by sowing the seeds in autumn, on a warm border, soon after they are ripe, or where they are to remain; or when permitted to scatter, they come up and form good plants. They afterwards require only to be kept clean from weeds, and in the former cases planted out, when of sufficient growth, where they are to grow.

They afford ornament and variety in the borders and other parts of shrubberies.

LAMB'S LETTUCE. See VALERIANA.

LANTANA, a genus containing plants of the shrubby, exotic, green-house, and stove kinds.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a one-leafed perianthium, very short, converging, obscurely four-toothed, tubular: the corolla one-petalled, nearly equal: tube cylindric, slender, longer than the calyx, rather oblique: border flat, unequally four-cleft, obtuse: the stamina have four filaments, very small, placed in the midst of the tube of the corolla, very slender, of which two are a little higher: anthers roundish: the pistillum is a roundish germ: style filiform, short: stigma refracted, sharp downwards, like a hook, and as it were obliquely growing to the tip of the style: the pericarpium is a roundish, one-celled drupe: the seed a round-pyramidal, three-celled nut: the lowest cell steril: the kernels solitary, oblong.

The species cultivated are: 1. *L. mista*, Various-flowered Lantana; 2. *L. Camara*, Various-coloured Lantana; 3. *L. involucrata*, Round-leaved Lantana; 4. *L. melissæfolia*, Baum-leaved Lantana; 5. *L. aculeata*, Prickly Lantana; 6. *L. aurea*, Golden-flowered Lantana.

The first is about five feet in height: the trunk round or roundish, with an ash-coloured bark: the branches at top, several, short, ash-coloured, and from these several others, a long span or a foot in length, quadrangular, green, hairy: the leaves above bright green and somewhat shining, beneath paler, deeply notched, much wrinkled, and very rugged: whilst the flower is yet closed, the lower part of the border appears of a pale red; when it opens, the tube and upper part of the border are saffron-coloured, but become reddish, and finally dark red: this change of colour begins from the circumference and finishes in the centre: hence the flowers in an umbel not being all opened at once, the middle appears of a saffron yellow, and the circumference of a red colour, whence the name. It is a native of America.

The second species has a shrubby stem, a fathom in height, angular, somewhat rugged: the branches subdivided, almost upright, rugged, quadrangular: the branchlets quadrangular, grooved, strict, hirsute, dark green: the leaves on long petioles, decussated, spreading, ovate, acuminate, serrate, nerved, hirsute: the flowers terminating: the peduncles shorter than the leaves, solitary, angular, grooved, hirsute: the bractes broad-lanceolate, concave, entire, pubescent. It is a native of the West Indies, flowering from April to September.

The third has a round woody stem, branched, scarcely hairy: the branches opposite: the leaves petioled, scarcely crenate, membranaceous, rigid, less wrinkled than in the others above, nerved beneath, tomentose: the leaves seldom if ever in threes: the peduncles short: the spikes rounded: the bractes large, sessile, cordate-ovate, with six or more nerves running in right lines from the centre, all a little excavated their whole length, and tomentose: the flowers whitish, with pale flesh-coloured margins. It is a native of the West Indies, flowering from May to July.

The fourth species is lower than most of the others, being seldom more than two feet in height: the stem round, ash-coloured, not hairy: the younger branches have bundles of hairs spreading out at top: the leaves opposite, but sometimes in threes, petioled, cordate-acuminate, more deeply crenate than in the other species, wrinkled, rugged and green on the upper surface; paler and tomentose-hairy underneath: the flowers axillary, with three peduncles, where there are three leaves: the bractes oblong, entire, tomentose-hairy, deciduous, differing in size: the colour of the corolla constant, and always yellow. It is a native of South America.

The fifth has the stem in its native situation ten feet high, an inch and a half thick, square from top to bottom, armed with long, strong, reflex prickles, or rather thorns, for they cannot be torn off without injuring the wood; but in the stove only five or six feet in height: the leaves ovate-oblong or cordate-oblong, wrinkled, rugged, crenate: the peduncles long, with fewer and shorter prickles: the colour of the tube of the corolla pale red: border lemon-coloured, changing into an orange and sometimes a deeper colour: the peduncles are terminated by roundish heads of flowers; those on the outside are first of a bright red or scarlet, and change to a deep purple; those in the centre are of a bright yellow, and change to an orange colour. It is a native of the West Indies, flowering from April to November.

The sixth species has the stem seven feet high, at first obscurely quadrangular, but afterwards round, striated, very thinly beset with prickles, and not hairy: the leaves ovate-oblong or almost elliptic, bluntly notched about the edge, very short stiff hairs at the upper surface, the lower rugged with a harsh down, dark green and shining as if they were varnished: the peduncles short: the bractes deciduous, short: the colour of the flower yellow, becoming golden and then saffron-coloured. It is a native of the Bahama Islands.

Culture.—These plants are capable of being raised by seeds and cuttings of the young branches.

The seeds should be sown in pots of light mould in the early spring, plunging them in a bark hot-bed. When the plants have attained some inches growth, they should be removed into separate pots of a small size, and be replunged in the bark-bed, due shade and air being given. The plants should afterwards, when they have acquired strength, be removed into an airy glass-case, or dry stove, where they may have a large share of air in warm weather, but be protected from the cold. This is necessary for the young plants, which should not the first year be exposed to the open air, but afterwards they may be placed abroad in the warmest part of summer, and in winter be placed upon stands in the dry stove, where they will continue long in flower, and many of the sorts ripen their seeds. In winter they should be sparingly watered, as much moisture rots their roots.

The cuttings should be planted in pots in the spring and summer months, as in July, and be plunged in a moderate hot-bed, due shade being given.

They soon take root, and should afterwards be removed into separate pots filled with light earth, and managed in the same manner as those raised from seed.

They afford ornament and variety among collections of stove and green-house plants.

LARCH TREE. See PINUS.

LARKSPUR. See DELPHINIUM.

LATHYRUS, a genus containing plants of the herbaceous climbing flowery kinds.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leafed perianthium, half five-cleft, bell-shaped: divisions lanceolate, sharp: the two upper ones shorter; the lowest longer: the corolla papilionaceous: standard obcordate, very large, reflex on the sides and tip: wings oblong, lunulate, short, obtuse: keel half-orbiculate, size of the wings, and wider than the wings, gaping inwards in the middle: the stamina have diadelphous filaments, (single and nine-cleft) rising upwards: anthers roundish: the pistillum is a compressed germ, oblong, linear: style erected upwards, flat, wider above, with sharp tip: stigma, from the middle of the style to the tip villose in front: the pericarpium is a legume, very long, cylindric or compressed, acuminate, one-celled, bivalve: the seeds several, cylindric, globose, or but little cornered.

The species cultivated are: 1. *L. odoratus*, Sweet Lathyrus, or Pea; 2. *L. Tingitanus*, Tangier Lathyrus, or Pea; 3. *L. latifolius*, Broad-leaved Lathyrus, or Everlasting Pea.

Several other species may be cultivatd where variety is wanted.

The first is an annual plant, which rises from three to four feet high by means of its long claspers or tendrils: the flower-stalks come out at the joints, are about six inches long, and sustain two large flowers, which have a strong odour, and are succeeded by oblong hairy pods, having four or five roundish seeds in each. It is a native of Sicily.

There are several varieties; as the purple-flowered, the white-flowered, the variegated or painted lady, sweet-scented, and the scarlet.

The second species has the stem four or five feet high: the leaflets veined: the peduncles short, sustaining two large flowers with purple standards, the wings and keel bright red: the legumes long, jointed, containing several seeds.

Martyn observes, the whole plant is very smooth: the stem branched, running out on each side into a slender sharp wing: the petioles angular, ending in bifid, trifid or simple tendrils: the stipules lanceolate, acuminate, produced downwards into an earlet, similar but much smaller: the peduncles sometimes one-flowered. It is a native of Barbary, flowering in June and July; and although it has not the agreeable scent, or variety of colours, or continuance in blow of the Sweet Pea, it is usually sown in gardens with other annual seeds.

The third has a perennial root: the stalks several, thick, climbing by means of tendrils to the height of six or eight feet, or even higher in woods: these die to the ground in autumn, and new ones rise in the spring from the same root: the leaves stiff, marked with three or five strong ribs, rolled in at the edge, blunt at the end, but terminating in a little point or bristle; they are always in pairs, and on a winged petiole; at the base of this are large stipules, shaped somewhat like the head of a halbert: the tendrils multifid or branched: the peduncles eight or nine inches long. Each flower has an awl-shaped bracte at the base of the pedicel: the corolla pale purplish rose-colour: the legumes an inch and half long, and half an inch in breadth. It is a native of many parts of Europe, flowering at the end of June and beginning of July.

It is a showy plant for shrubberies, wilderness quarters, arbours, and trellis-work; but too large and rampant for borders of the common flower-garden.

There are many varieties; as the red-flowered, the purple-flowered, the scarlet-flowered, and the large-flowered.

Culture.—These plants may be readily raised, by sowing the seeds of the different sorts in the

autumn or spring seasons at different times, in patches of six or eight together, in the places where they are to grow. Where the soil is light and dry, the autumn is the best season, as the plants appear more early, but in other cases the spring should be preferred. The plants afterwards only require to be kept clean from weeds, and be properly supported by branchy sticks.

The last sort may likewise be increased by transplanting the roots in the autumn; but the plants in this way are seldom so good as by seeds.

The two first sorts must be sown annually, but the last will remain many years.

It is the practice with the gardeners who raise the first sorts for the London markets, to sow them in the autumn in pots, and secure them from severe weather, by placing them in hot-bed frames; by which means they can bring them much more early to market. They may be continued in flower the whole summer by repeated sowings in the spring. When sown in pots they should be watered frequently

They are all highly ornamental in the borders, clumps, and other parts of pleasure-grounds, when properly intermixed in their species and different varieties.

LAVANDULA, a genus comprising plants of the shrubby evergreen kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leafed perianthium, ovate: mouth obscurely toothed, short, permanent, supported by a bracte: the corolla one-petalled, ringent, resupine: tube cylindric, longer than the calyx: border spreading: one lip looking upwards, larger, bifid, spreading: the other lip looking downwards, trifid: divisions all roundish, nearly equal: the stamina have four short filaments, within the tube of the corolla, deflected, of which two are shorter: anthers small: the pistillum is a four-parted germ: style filiform, length of the tube: stigma two-lobed; obtuse, converging: there is no pericarpium: calyx converging with the mouth and guarding the seed: the seeds four, obovate.

The species cultivated are: 1. *L. Spica*, Common Lavender; 2. *L. Stœchas*, French Lavender; 3. *L. dentata*, Tooth-leaved Lavender; 4. *L. multifida*, Canary Lavender.

The first has a perennial, thick, woody root: the stem shrubby, much branched, frequently five or six feet high, four-cornered, acute-angled, tomentose: the leaves numerous, blunt, hoary, the upper ones sessile, the lower petioled: the flowers are produced in terminating spikes from the young shoots, on long peduncles; the spikes are composed of interrupted whorls in which the flowers are from six to ten, the lower whorls more remote: each flower upright, on a short pedicel: the bractes broad-ovate, awned, acuminate, veined: the common colour of the corolla is blue, but it varies with white flowers: the whole plant is covered with a down composed of forked hairs. It is a native of the South of Europe, flowering here from July to September.

There are varieties with narrow leaves with blue flowers, and with white flowers with broad leaves, and Dwarf Lavender.

This species is the Common Lavender; but the narrow-leaved variety with blue flowers is the sort cultivated for its flowers, for medicinal purposes.

The broad-leaved sort has much shorter and broader leaves, and the branches are shorter, more compact, and fuller of leaves: it continues several years without producing flowers; and when it does, the leaves on the flowering-stalks approach nearer to those of the Common Lavender, but are still broader: the stalks grow taller, the spikes are looser and larger, the flowers smaller, and appear a little later in the season.

The second species has a low, thick, shrubby stalk, about two feet high, sending out woody branches the whole length: the leaves about an inch long, hoary and pointed, of a strong aromatic scent, opposite at each joint, with smaller leaves of the same shape coming out at the same places: the branches are terminated with scaly spikes of purple flowers, four-cornered, and an inch in length; and at the top is a coma or small tuft of purple leaves. When it begins to flower, there are only four flowers in a whorl, but these are afterwards increased by the lateral gems, till it becomes gradually round. The whole plant has a very strong, aromatic, agreeable odour. It is a native of the South of Europe, flowering from May to July.

There are varieties with white flowers; and with purple flowers.

The third species has a woody stalk two or three feet high, with four-cornered branches on every side the whole length: the leaves are opposite about an inch long, and an eighth of an inch broad, indented regularly on both sides almost to the midrib, of a grayish colour, a pleasant aromatic odour, and a biting warm taste: the flowers are produced in scaly spikes at the ends of the branches upon long naked peduncles: the spikes are four-cornered, hairy, and about an inch long, terminated by a few purplish leaves. It is a native of Spain, flowering from June to September.

The fourth is an annual (or rather a biennial

plant, with an upright branching woolly stalk two feet high: the leaves hoary, opposite, cut into many divisions to the midrib: these segments are again divided on their borders towards the top into three blunt ones, so that they end in many points: the peduncle is continued from the end of the branch, is naked, and about six inches long, quadrangular, and terminated by a close spike of flowers about one inch long: the rows of flowers are twisted spirally. There are commonly two small spikes below this, and about an inch from it: the corolla varies from blue to white. It is a native of Spain.

There is a variety which rises with an upright, branching, square stalk, four feet high: the leaves longer, and cut into narrower segments than the Spanish plant: they are of a lighter green, and almost smooth: the naked flower-stalk is also much longer, and terminated with a cluster of spikes of blue flowers: at two or three inches below these are two small spikes, one on each side: the flowers are smaller than those of the first sort. It is a native of the Canary Islands.

Culture.—All the sorts are readily increased, by planting slips or cuttings of their young shoots in the spring.

In the first two sorts, a quantity of slips or cuttings should be taken off in the early spring, as March or April, from three or four to six inches long, stripping off the under-leaves, then planting them in a shady border, four inches asunder, giving a good watering, and repeating it occasionally in dry weather. When the plants are well rooted in summer, they should be transplanted into the place were they are to grow, early in autumn, as September or October, with balls of earth about their roots.

When the first sort is intended to produce flowers for economical purposes, it should be planted in rows, two or three feet asunder, and about the same distance in the rows, or in a single row one or two feet asunder, along the edge or divisions of garden-grounds, in a sort of edging or dwarf hedge; in either of which modes the plants grow freely, continuing in root, stem and branches several years, and produce abundance of spikes of flowers annually for gathering in the latter end of summer: the culture afterwards is principally to cut down any remaining decayed flower-stalks in autumn, pruning or cutting away any disorderly out-growing branches at top and sides, and digging the ground occasionally in spring or autumn along the rows of plants.

The second sort may also often be raised from seeds, which should be sown in a bed of light earth in the early spring, and raked in evenly with a light hand. The plants rise in about a month, when, if there be dry weather, water should be given; and after they are three inches high, they should be pricked out in beds, half a foot apart, watering them as they require, until fresh rooted. They should stand here till the following spring, and then be thinned out, and planted where they are to remain.

The two first sorts are useful for their fine spikes of flowers, as well as ornamental in assemblage with other shrubby plants, in the borders and clumps of pleasure-grounds; and the two last sorts in green-house collections with other potted plants.

Those designed for shrubberies or other similar places, being previously raised to some tolerable bushy growth, and a foot high or more, should be planted either in the early autumn, or in the spring, disposing them singly at proper distances in the fronts.

The third and fourth sorts may be increased by slips and cuttings, planted in pots in the early spring months, and placed under frames, due water and shade from the mid-day sun being given till they are rooted; and when a little advanced in growth, transplanted into separate small pots, and managed as other green-house exotic plants.

LAVATERA, a genus containing plants of the herbaceous shrubby perennial kinds.

It belongs to the class and order *Monadelphia Polyandria*, and ranks in the natural order of *Columniferæ*.

The characters are: that the calyx is a double perianthium: exterior one-leafed, trifid, obtuse, short, permanent: interior one-leafed, half five-cleft, more acute, more erect, permanent: the corolla has five obcordate flat petals, spreading, affixed below to the tube of the stamens: the stamina have numerous filaments, coalescing below into a tube; loose above (gaping at the tip and surface of the tube): anthers reniform: the pistillum is an orbicular germ: style cylindric, short: stigmas several (seven to fourteen), bristly, length of the style: the pericarpium is an orbicular capsule, composed of as many cells as there are stigmas, bivalve, and articulated in a whorl round the columnar receptacle, at length falling off: the seeds solitary and reniform.

The species cultivated are: 1. *L. Cretica*, Cretan Lavatera; 2. *L. trimestris*, Common Annual Lavatera; 3. *L. Thuringiaca*, Great-flowered Lavatera; 4. *L. arborea*, Tree Lavatera, or Mallow; 5. *L. Olbia*, Downy-leaved Lavatera; 6. *L. triloba*, Three-lobed Lavatera; 7. *L. Lusitanica*, Portuguese Lavatera.

The first has an annual fibrous root of thick fibres, a foot in length, with innumerable other capillary fibres: the stem round, rugged, five

feet high, branched: the leaves on long petioles, very soft, tomentose, toothed, seven-angled, the angles of the upper ones sharper; the stipules lanceolate, ciliate, bowing at bottom and then erect: the flowers axillary, about four together, on upright peduncles: the outer calyx cup-shaped, with ovate segments: inner a little longer, five-cornered above, with lanceolate segments: the corolla twice the length of the calyx, pale blue, with oblong, emarginate petals: the germ orbicular-flatted, ten-grooved: the stigmas ten: the fruit smooth, within the calyx: the capsules ten, round a column terminated by a hemisphere with a very small point at top, disappearing when the fruit is ripe, and leaving a hole in the middle of the capsules, which then turn black. It is a native of the island of Candia or Crete, flowering in July.

It varies with red flowers, with white flowers, and with purple flowers.

The second has also an annual root, white, with spreading beards: the stem round, two feet high, branched, the lower branches almost horizontal: the leaves crenate-toothed, smooth, on long petioles, gradually narrowed towards the tip: stipules ovate-lanceolate, ciliate, bowed at bottom and then straight: the flowers solitary, axillary, on peduncles shorter than the petiole: outer calyx semi-trifid, with keeled segments; inner larger, with lanceolate segments, curled at the edge: the corolla large, spreading, bell-shaped, pale flesh colour, with whitish lines: petals broader above, crenate, frequently rolled up, the edges of the claws deep purple: the germ very smooth: the style multifid: the stigmas pale-flesh-coloured, longer than the tube, thirteen to eighteen: the fruit hemispherical, convex beneath, covered at top with a circular, concave, smooth lid or peltate umbrella: there are about twenty capsules in a whorl; they are brown, closed all round and not opening, with a longitudinal raised line along the back, elegantly marked on the sides with flexuose streaks drawn from the circumference to the centre: the seeds are ferruginous. It is a native of the South of Europe, &c. flowering from July to September.

There are several varieties.

The third has the stem five or six feet high, woolly, branched: the lower leaves heart-shaped, crenate, roundish-lobed: upper hastate, on short petioles: the stipules lanceolate: the flowers axillary, solitary, peduncled; peduncles longer than the leaf: the calyxes subtomentose: the segments of the outer heart-shaped, with a very sharp point; of the inner oblong acute: the corolla large, spreading, pale violet or purplish, shaped like those of the Marsh-mallow, but larger: petals emarginate: the capsules about twenty (fourteen) in a wing of a papery substance, somewhat rugged, about a columnar receptacle, which has many wings from the permanent sides of the capsules, like the cogs of a mill wheel, ending in a conical awl-shaped point: the seeds flatted a little, smooth, subcinereous or brown. It is a native of Sweden, flowering from July to September.

The fourth species rises with a strong thick stalk the height of eight or ten feet (in gardens), dividing into many branches at the top: in its wild state, when largest, from four to six feet high, and as much as four inches in diameter: the leaves are alternate, numerous, cordate, roundish-seven-angled (some five- and others three-angled), the angles blunt, soft as velvet, shorter than the petioles: the stipules short, smooth, acuminate at the tip, broad at the base: the flowers mostly in pairs, sometimes three together, on upright peduncles an inch and a half in length: the outer calyx ovate at the base, divided half way into three broad blunt segments; inner only half the size, divided half way into five sharp segments: the corolla purplish red, with dark blotches at the base, spreading bell-shaped (like that of the common Mallow), an inch or more in diameter: the petals broader at top, narrow at the base, so that the calyx appears between the claws: the cylinder of filaments purple, woolly at the base: the germ very smooth: the style usually eight-cleft at top: the stigmas revolute, reddish: the ring or whorl of fruits is seven- or eight-capsuled: the common receptacle awl-shaped, with a conoid globule at top, and small crescent-shaped lamellæ at the base and the interstices of the capsules: the capsules are reniform-rounded, sharply three-cornered, membranaceous, wrinkled, closed on all sides, pale bay-coloured, not opening: the seeds kidney-shaped, and ash-coloured. It is a native of Italy, &c. flowering from June or July to September or October.

The fifth has a round branched stem, five feet high, villose at top, reddish: the leaves soft, whitish, tomentose, unequally serrate; the lower subcordate-hastate, five-angled; the upper ovate, three-cusped, the middle lobe narrowed, acute, oblong: the stipules ovate-lanceolate, villose: the flowers on short peduncles, axillary, solitary, very seldom two together; terminating ones in a spike: the outer calyx ovate, with roundish-acute segments; inner larger, with lanceolate-acute segments: the corolla large, spreading very much, reddish-purple: the petals with narrowed claws, covered with white hairs, inserted into a flesh-coloured tube: the stamens purple: the germ roundish-compressed, with twenty grooves: the style divided into about twenty

parts: the stigmas long, recurved: the capsules about twenty, black, smooth, fixed in a ring about a thick striated cone: when the seeds are ripe, that part which is next to the axis appears naked, on account of the pellicle which forms the internal part of the capsule adhering to the axis. According to Linnæus, the leaves of the first year are very large, and those of the following much smaller, which is a circumstance common to this with other plants of the same natural order. It is a native of the South of France, flowering from June to October.

The sixth species has a round branched stem, from three to four feet in height: the leaves are alternate, petioled, shorter than the petioles, roundish, but with the border so rolled back as to appear triangular: the stipules cordate, broad, acuminate, serrate: the flowers axillary: three peduncles, mostly one-flowered, in each axil, upright, shorter than the petiole: the segments of the outer calyx broad-cordate, acuminate: the inner calyx twice as large, five-cornered, acuminate, with the corners prominent: corolla large, spreading, pale purple, with the claws white, hairy: the capsules about fifteen, in a ring about a column ending in a point. According to Linnæus, the whole plant is tomentose, being covered with very small glutinous hairs, with other larger ones stellate at top mixed among them. It is a native of France and Spain, flowering from June to September.

The seventh is a native of Portugal, flowering in August and September.

Culture.—The first two, or annual sorts, are readily increased, by sowing the seeds in a light soil in the places where the plants are to remain, or in pots, in the spring season, as about the latter end of March, in patches of four or five in each, giving them water occasionally when the weather is dry. When the plants have attained a little growth, they should be thinned out to one or two of the strongest plants. When any are to be removed to other places, it should be done at this period, and with a little earth about the roots, due water and shade being given; but they seldom succeed well by transplanting.

All the other shrubby perennial sorts may likewise be increased by sowing the seeds, and managing the plants in the same manner.

Most of these sorts will not last more than two years in this climate, unless the soil be dry, when they continue three or four.

They in general require a warm dry situation, or to have their roots covered by old tan, or the protection of the green-house during the severity of the winter season.

They are all highly ornamental in different parts of pleasure-grounds. The annual sorts have great beauty, in their flowers being large, numerous, and conspicuous, and are proper where large showy-flowering plants are required. The perennial kinds are also suitable for large borders and shrubbery compartments, having large, straight, upright, durable stems, terminated by branchy bushy heads, and very large soft foliage, that form a fine variety in assemblage with other plants, though their flowers are often hidden by their large leaves.

LAVENDER. See LAVANDULA.

LAVENDER COTTON. See SANTOLINA.

LAUREL. See LAURUS and PRUNUS.

LAUREL SPURGE. See DAPHNE.

LAUREOLA. See CESTRUM and DAPHNE.

LAURESTINE. See VIBURNUM TINUS.

LAUROCERASUS. See PRUNUS.

LAURUS, a genus containing plants of the evergreen and deciduous tree kinds for the borders, green-house, and stove.

It belongs to the class and order *Enneandria Monogynia*, and ranks in the natural order of *Holoraceæ*.

The characters are: that there is no calyx (unless the corolla be so called): the corolla has six ovate acuminate petals, concave, erect: the alternate ones exterior: nectary consisting of three acuminated coloured tubercles, ending in two bristles, standing round the germ: the stamina have nine filaments, shorter than the corolla, compressed, obtuse, three in each rank: anthers growing on each side to the margin of the filament on the upper part: glandules two, globose, with a very short footstalk, affixed to each filament of the inner rank near the base: the pistillum is a subovate germ: the style simple, equal, length of the stamens: stigma obtuse, oblique: the pericarpium is a drupe (or berry), oval, acuminate, one-celled, comprehended by the corolla: the seed is an ovate-acuminate nut: the kernel of the same form.

The species cultivated are: 1. *L. nobilis*, Common Sweet Bay; 2. *L. æstivalis*, Willow-leaved Bay; 3. *L. Benzoin*, Common Benjamin-tree; 4. *L. Sassafras*, Sassafras-tree; 5. *L. Indica*, Royal Bay, or Indian Laurel; 6. *L. Borbonia*, Broad-leaved Carolina Bay, or Red Bay; 7. *L. Camphora*, Camphor, or Gamphire-tree; 8. *L. Cinnamomum*, Cinnamon-tree; 9. *L. Cassia*, Cassia, or Wild Cinnamon-tree; 10. *L. Persea*, Alligator Pear.

The first in this climate appears as a shrub, but in the southern parts of Europe it becomes a tree of twenty or thirty feet in height; much subject, however, in general, to put out suckers: the leaves are evergreen, of a firm texture, the largest from an inch and a half to two inches in

breadth in the broad-leaved variety, and from three to four inches in length, entire, on short petioles, having an agreeable smell, and an aromatic, subacrid, bitterish taste: the flowers are dioecious, or male and female on different trees, in racemes shorter than the leaves, of an herbaceous colour: the corollas four-petalled in the male flowers, with from eight to twelve stamens: the berry superior, ovate, fleshy, dark purple almost black: the receptacle none, except a small tubercle at the bottom, whence a vascular band rises on each side the whole length of the seed; which is large, ovate, slightly mucronate above. It is a native of the southern parts of Europe, and of Asia.

There are several varieties; as the broad-leaved, which is almost too tender for the open air in this climate, with leaves much broader and smoother than those of the common sort;—the common, which is seldom hurt in this climate, except in very severe winters, of which there are two subvarieties, one with plain leaves, the other with leaves waved on the edges;—the narrow-leaved, with very long narrow leaves, not so thick as those of the preceding two sorts, and of a light green, the branches covered with a purplish bark, and the male flowers come out in small clusters from the axils of the leaves, sitting close to the branches; of which there are subvarieties in the nurseries with variegated leaves.

What is now called Bay was formerly called Laurel, which has introduced some confusion.

The second species rises with a shrubby branching stalk eight or ten feet high, covered with a purple bark: the leaves are opposite, near two inches long and one inch broad, smooth on their upper side, but veined on their under, where they are rough: the berries red, nearly the size and shape of the common Bay-berry. It is a native of North America.

The third rises to the height of ten or twelve feet, dividing into many branches: the leaves are near three inches long, and an inch and a half broad, smooth on their upper surface, but with many transverse veins on their under side: the flowers of a white herbaceous colour, with six stamina in each: the involucre is sessile, four-leaved, much resembling that of Cornus, including five petioled florets, the length of the involucre: proper calyx (or corolla) six-parted, yellow, with linear segments: the stamens eight or nine, the length of the calyx, appendicled on the sides: the germ ovate, within the calyx: the style simple. It is a native of Virginia.

Martyn observes that it has been confounded with the true Benzoin tree. See STYRAX BENZOIN.

The fourth species is commonly a shrub, seldom rising more than eight or ten feet high (it sometimes, however, grows into a large tree): the leaves are of different shapes and sizes; some oval and entire, about four inches long and three broad; others are deeply divided into three lobes; these are six inches long, and as much in breadth from the extremity of the two outside lobes; they are placed alternately on pretty long footstalks, and are of a lucid green; they fall off early in the autumn; and in the spring, soon after the leaves begin to come out, the flowers appear just below them, on slender peduncles, each sustaining three or four small, yellow (greenish white) flowers, which have five oval concave petals, and eight stamina in the male flowers, which are upon different plants from the hermaphrodite flowers: these are succeeded by an oval berry, which, when ripe, is blue. It is a native of America. Its wood is of a light and spongy texture, having a fragrant smell, and a sweetish aromatic taste.

The fifth is a large tree with ascending branches: the branches, and particularly the shoots, are tubercled with scars from the fallen leaves; they are alternate, curved inwards, wrinkled and smooth: the leaves scattered, acuminate with a bluntish point, quite entire, smooth, veined, reflex, four inches long: the petioles semi-cylindric, grooved, smooth, reflex: the flowers terminating, below racemed, above panicled: the panicle trifid: ovate, red nectareous scales at the base of the filaments, which vary in number from seven to nine; six outer, and one, two, or three inner: they are unequal, flat, and nearly equal to the calyx: the anthers compressed, four-celled: the germ roundish: the style very short: the berry globular, small, and brown. It is a native of Madeira.

The sixth species rises with a straight large trunk to a considerable height near the sea; but in the inland parts of the country it is of humbler stature: the leaves are much longer than those of the Common Bay, and are a little woolly on their under side; their edges are a little reflexed; the veins run transversely from the midrib to the sides: the male flowers come out in long bunches from the axils of the leaves: the female flowers in loose bunches on pretty long red peduncles: the berries are blue, in red cups, growing two and sometimes three together. It is a native of America.

The seventh species is very near akin to the ninth, from which it differs in the leaves, those of the latter having three ribs running longitudinally from the foot-stalk to the point, where they soon diminish; whereas in this the

ribs are small and extend towards the sides; their surface is smooth and shining: they are male and hermaphrodite in different trees: it is a large tree, with ascending branches: the leaves quite entire, smooth, mostly alternate, but some opposite, petioled, whitish underneath: the flowers white, on simple, long, lateral peduncles: the berry small, ovate, dusky or brownish red. It is a native of China, &c. Its wood is in much esteem for carpenters' purposes, being easily wrought, light, durable, and not liable to be injured by insects, particularly the *coombang*, a species of bee, which, from its faculty of boring timber for its nest, is called the *Carpenter*.

The chief of the Camphor used in Europe is prepared from this tree in Japan, by splitting the wood into small pieces, and subliming or distilling it with water in an iron retort, covered with an earthen or wooden head, in the hollow of which they fasten hay or straw, to which the Camphor, as it rises, adheres. This Camphor is brownish or white, but in very small semi-pellucid grains. It is packed up in wooden casks, and thus sent to India and Europe, where it is purified by a second sublimation, and reduced into the solid mass as found in the shops. Native Camphor, or the *Capoor Barroos* of the Malays, is a production obtained in Sumatra and Borneo by cutting down the trees, and splitting them with wedges into small pieces, the Camphor being found in the interstices in the state of a concrete crystallization. Some have asserted that it is from the old trees alone that this substance is procured, and that in the young trees it is in a fluid state, called *meenio capoor* or Camphor oil; but this is a mistake: the same sort of tree that produces the fluid does not produce the dry, transparent flaky substance, nor ever would. They are readily distinguished by the natives. Many of the trees, however, produce neither the one nor the other. The traders usually distinguish three degrees of quality, by the names of *head*, *belly*, and *foot*, according to its purity and whiteness. Some add a fourth sort, of extraordinary fineness, of which a few pounds only are imported to Canton, and sell there at the rate of two thousand dollars the *peeul*.

The Common Camphor will evaporate till it wholly disappears; while that of Sumatra and Borneo, called *Native Camphor*, though subject to some decrease, does not appear to lose much in quantity from being kept.

Camphor oil is obtained by the Sumatrans by making a transverse incision into the tree, to the depth of some inches, and then cutting slopingly downwards from above the notch, till a flat horizontal surface be left. This they hollow out, till it is of a capacity to receive a quart: then put into the hollow a bit of lighted reed, and let it remain for about ten minutes, which acting as a stimulus, draws the fluid to that part. In the space of a night the liquor fills the receptacle previously made. The trees are soon exhausted.

The eighth in its native situation is a tree twenty feet high or more, the trunk about six feet high, a foot and a half in diameter, the outer bark smoothish, and of a dusky cinereous colour; it has spreading branches that form an elegant head; but in our stoves it is only of low growth: the leaves are opposite or nearly so, ovate-oblong, oblong-acuminate, or subovate, bluntly acuminate, quite entire, shining, coriaceous, on short petioles, from three to five inches long; the three nerves spring from the petiole, and either immediately recede from each other, or continue united for a line or two and then diverge; they are of a bright green on the upper surface, but pale on the under, with the nerves whitish. On the younger branches or twigs arise slender common peduncles, from opposite axils, the terminating ones an inch, the others two or three inches long, three-flowered at top, or else trifid, with each division three-flowered: the flowers small, greenish yellow, almost insipid, with a somewhat fœtid smell: the fruit the form and size of a middling Olive, insipid, deep blue and soft, inclosing a thin, pale-coloured nut with a white kernel, which germinates soon after it falls, and therefore cannot easily be transported to a distance: the inner bark perfectly resembles the Oriental Cinnamon in smell, taste, and figure; the only difference is, that it has a coarser texture, and a more acrid taste, which may arise from the climate. It is a native of Martinico and Brazil, flowering in February and March.

There are several varieties; but it is the Ceylon Cinnamon that is chiefly used as a spice.

The ninth is supposed, according to Martyn, not to be a distinct species from the true Cinnamon. The difference of the bark may, he supposes, be owing to soil or situation, but more probably to want of skill or attention in the cultivators. The Cassia bark is coarser, and will not roll up like true Cinnamon; but the essential difference between the bark of Cinnamon and Cassia is, that the former is always dry, whereas the latter becomes mucilaginous in chewing; hence it has been suggested here, as a conjecture on the most respectable authority, that the superior excellence of Cinnamon bark may be in a great measure owing to its having been deprived of that mucilage which adheres to its interior surface.

Marsden asserts that the Cassia tree grows from fifty to sixty feet high, with large spreading horizontal branches, almost as low as the earth: the leaves are about four inches long, narrower than those of the Bay, and more pointed, deep green, with a smooth surface and plain edge: the principal fibres or nerves take their rise from the peduncle: the young leaves are mostly of a reddish hue: the blossoms grow six in number upon slender footstalks, close to the bottom of the leaf: they are monopetalous, small, white, and stellated in six points: the stamina are six (nine), with one style growing from the germ, which stands up in three brownish segments resembling a cup. It is a native of Malabar.

The bark is commonly taken from such trees as are a foot or eighteen inches in diameter, as when they are younger, it is said to be so thin as to lose all its qualities very soon. Those trees which grow in a high rocky soil have red shoots, and the bark is superior to that which is produced in a moist clay where the shoots are green. Marsden has been assured by a person of extensive knowledge, that the Cassia produced in Sumatra is from the same tree that yields the true Cinnamon, and that the apparent difference arises from the less judicious manner of quilling it. Perhaps the younger and more tender branches should be preferred; perhaps the age of the tree, or the season of the year, ought to be more nicely attended to; and it is suggested, that the mucilage which adheres to the inside of the fresh-peeled rind, when not carefully wiped off, injures the flavour of the Cassia, and renders it inferior to that of the Cinnamon.

The tenth species grows to the height of thirty feet or more in the West Indies, and has a trunk as large as common Apple-trees: the bark is smooth, and of an ash colour: the branches are beset with pretty large, oblong, smooth leaves, like those of Laurel, of a deep green colour, are succulent, and soft. The flowers are for the most part produced towards the extremities of the branches: the fruit is the size of one of our biggest pears, inclosing a large seed with two lobes, included in a thin shell. It is held in great esteem in the West Indies: the pulp is of a pretty firm consistence, and has a delicate rich flavour; it gains upon the palate of most persons, and becomes soon agreeable even to those who cannot like it at first; but it is so rich and mild, that most people make use of some spice or pungent substance to give it a poignancy; and for this purpose, some make use of wine, some of sugar, some of lime-juice, but most of pepper and salt. It is a native of the West Indies.

Culture.—The first sort may be increased by seed, layers, and suckers.

The seed should be sown soon after the berries are ripe, or early in spring, either in beds, covering them with earth near an inch deep, or in drills half a foot asunder, the same depth: when the plants are come up, they should be supplied with frequent waterings during summer, and in winter defended from severe frost by the shelter of mats, or some other covering, being tender while young; and after having two summers' growth in the seed-bed, in the spring following the strongest should be removed into nursery rows, one or two feet asunder, and a foot apart in each row, giving water in dry weather, till they have taken good root, and keeping them clear from weeds. When they are half a yard, or two or three feet high, they are of proper growth for transplanting into the shrubbery in autumn or spring.

The berries may also be sown in pots, and plunged in a hot-bed in spring, which brings the plants forwarder, being careful to inure them to the full air in the summer season.

Some of the lower branches that are well furnished with young shoots may be laid down in the early spring, or in August, but the latter is the better season; each shoot being slit-layed: they become rooted in one year, when in spring they may be taken off, and planted in the nursery, as directed for the seedlings.

The suckers should be taken up with good roots in autumn or spring, and be planted in the nursery like the seedlings and layers.

It is also capable of growing by cuttings, planted in the beginning of April on a moderate hot-bed of tanners' bark covered eight inches deep with rich loose fresh earth, five inches deep, and eight or nine asunder, rubbing off their leaves, and watering them gently every evening while the bed continues warm, covering the glasses with mats during the heat of the day. When the cuttings have shot roots, they should receive all mild gentle showers, and the evening dews. In the beginning of August, the glasses may be taken off, being replaced when the weather begins to be frosty; keeping them open every mild day. In the beginning of the April following, or as soon as the weather becomes temperate, both glasses and frames should be removed, continuing frequent and plentiful waterings during the summer months, as the weather may require; and in the succeeding April the plants will be strong, well rooted, and fit for planting out.

When the plants raised in these ways are removed to the nursery, they should have their

superfluous roots and branches cut away, encouraging the leading shoots; planting them in a well-sheltered quarter of light mould. The ground should be dug over in autumn and spring, keeping it clean, loose, and mellow in summer, and the plants be annually pruned in April.

The gold-striped variety is tender, being commonly kept in pots, and housed with hardy green-house plants. When it stands in the open ground, it is sometimes much injured in severe winters. The method of increasing it is by budding it on the plain sort.

The broad-leaved and narrow-leaved varieties are not so hardy as the common sort, being scarcely able to live abroad whilst young, in common winters, without shelter. As in severe winters the old trees are frequently killed, or at least the branches much injured, the plants are frequently kept in tubs, and housed in winter.

The second, third, and fourth sorts may be increased by seed, by layers, and sometimes by suckers and cuttings. The seeds or berries procured from America, and preserved in sand, should be sown as soon after they arrive as possible, in a bed of light earth an inch deep, or in largish pots the same depth, plunging them in mould, in an eastern border, up to their rims, till the spring following; when they should be placed in a hot-bed, which greatly forwards the germination of the seed, and soon brings up the plants. They must be timely inured to the full air. The plants raised by either method should, while young, be watered during summer, and sheltered from frost in winter, and when two years old be planted out in nursery rows, as directed for the other plants. They may also be increased by layers and suckers in the same manner as directed for the first sort; but it is sometimes long before the layers are rooted.

They are likewise sometimes capable of being increased by cuttings, by the aid of a good hot-bed.

The fifth, sixth, and seventh sorts may be increased by layers, but they are sometimes two years before they are sufficiently rooted. They may also be raised from seeds, procured from the places of their natural growth, sowing them in pots, and plunging them in a hot- or bark-bed; but without this aid they do not always grow freely the first season; in which case they should be placed in the open air in summer, and in a frame or in the green-house, near the windows, in winter; and in spring the pots be plunged in a hot-bed, which will bring up the plants, giving air daily, and frequent waterings, and inuring them by degrees to the open air as the summer advances; placing them in shelter in winter, and in the following spring planting them out in separate small pots, managing them as other green-house shrubs.

The eighth, ninth, and tenth sorts are also raised by layers and seed, sown and managed as above, generally assisted by the bark-bed of the stove; the plants being planted off into separate pots, and managed afterwards as other hot-house plants.

The first, second, third, and fourth sorts are highly ornamental in the borders and clumps in pleasure-grounds; the three following in green-house collections; and the three last among other stove plants.

LAWN, an open space of short grass-ground, in the front of a residence, or in a garden, park, or other pleasure-ground.

Lawns extended in the principal fronts of habitations, add considerably to the neatness and grandeur of their appearance, by laying them open, and admitting more extensive prospects. Where there is a sufficient scope of ground, they should be as large as the nature of the situation will admit, always being planned in the most conspicuous parts immediately adjoining the houses, and extended outward as far as convenient, allowing width in proportion; having each side or verge bounded by elegant shrubbery compartments in a varied order, separated in some parts by intervening spaces of grass-ground, of varied dimensions, and serpentine gravel-walks, gently winding between and through the plantations, for occasional shady, sheltered, and private walking; or similar walks carried along the fronts of the boundary plantations, and immediately adjoining the Lawns, for more open and airy walking in; and in some concave sweeps of the plantations there may be recesses and open spaces both of grass and gravel, of different forms and dimensions, made as places of retirement, shade, &c.

The usual situations of Lawns are those just mentioned; but if the nature of the ground admit, or in cases where there is good scope of ground, they may be continued more or less each way; but always the most considerably on the principal fronts, which if they be to the south, or any of the southerly points, they are the most desirable for the purpose.

The dimensions may be from a quarter of an acre or less, to six or eight acres or more, according to the extent and situation of the ground. Sometimes Lawns are extended over ha-has, to ten, twenty, or even to fifty or sixty acres or more.

The form must be directed by the nature of the situation; but it is commonly oblong, square, oval, or circular. But in whatever figure they

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Engraved by F. Sansom

1 *Lavatera Trimestris*
Annual Lavatera

2 *Lathyrus Sativus*
Blue flowered Lathyrus

are designed, they should widen gradually from the house outward to the furthest extremity, to have the greater advantage of prospect; and by having that part of them within the limits of the pleasure-ground, bounded on each side by plantations of ornamental trees and shrubs, they may be continued gradually near towards each wing of the habitation, in order to be sooner in the walks of the plantations, under shade, shelter, and retirement. The terminations at the further ends may be either by ha-has to extend the prospect, or by a shrubbery, or plantation of stately trees, arranged in sweeps and concave curves. But where they extend towards any great road, or distant agreeable prospect, it is more in character to have the utmost verge open, so as to admit of a grand view from and to the main residence.

The side-boundary verges should have the plantations rurally formed, airy, and elegant, by being planted with different sorts of the most ornamental trees and shrubs, not in one continued close plantation, but in distinct separated compartments and clumps, varied larger or smaller, and differently formed, in a somewhat natural imitation, being sometimes separated and detached less or more, by intervening breaks and open spaces of short grass, communicating both with the Lawns and interior districts; and generally varied in moderate sweeps and curves, especially towards the Lawns, to avoid stiff, formal appearances, both in the figure of the Lawns and plantations. In planting the trees and shrubs, which should be both of the deciduous and evergreen kinds, where intended to plant in distinct clumps, either introduce the deciduous and evergreens alternately in separate parts, or have some of both interspersed in assemblage; in either method placing the lower growth of shrubs towards the front, and the taller backwards in proportion to their several statures, so as to exhibit a regular gradation of height, that the different sorts may appear conspicuous from the main Lawns. They may be continued backwards to a considerable depth, being backed with trees and shrubs of more lofty growth. The internal parts of the plantations may have gravel or sand walks, some shady, others open; with here and there some spacious short grass openings of different dimensions and forms.

Extensive Lawns in parks or paddocks, &c. have seldom any boundary plantations close to what may be considered as a continuation of them beyond the pleasure-ground, but are sometimes dotted with noble trees, dispersed in various parts, at great distances, so as not to obstruct the view; some placed singly, others in groups by twos, threes, fives, &c. and some placed irregularly, in triangles, sweeps, straight lines, and other different figures, to cause the greater variety and effect, each group being diversified with different sorts of trees, all suffered to take their natural growth.

These kind of spaces or openings should always be kept perfectly neat, by being often poled, rolled, and mown. See GRASS-GROUND, and TURFING.

LAWSONIA, a genus containing plants of the exotic tree kind for the stove.

It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Salicariæ*.

The characters are: that the calyx is a four-cleft perianthium, small, permanent: the corolla has four petals, ovate-lanceolate, flat, spreading: the stamina have eight filiform filaments, length of the corolla, in twin pairs between the petals: anthers roundish: the pistillum is a roundish germ: style simple, length of the stamens, permanent: stigma headed: the pericarpium is a capsule (or berry), globose with a point, four-celled: the seeds many, cornered and pointed.

The species are: 1. *L. inermis*, Smooth Lawsonia; 2. *L. spinosa*, Prickly Lawsonia.

The first rises with a shrubby stalk eight or ten feet high: the branches come out by pairs opposite; they are slender and covered with a whitish yellow bark: the leaves are small, opposite, oblong, ending in acute points, pale green: the flowers in loose terminating bunches, gray or dirty white: the petals small, turning back at the top. It is a native of India, &c.

The second species rises with a woody trunk eighteen feet high or more: the wood is hard and close, covered with a light gray bark: the branches alternate: the leaves oblong-oval: at the joints where the leaves are placed come out single, strong, sharp thorns: the flowers are in loose bunches from the sides of the branches, pale yellow, of a disagreeable scent. It is a native of the East Indies.

Culture.—These plants may be raised by sowing the seeds in pots of light mould in the early spring, plunging them in the bark-bed of the stove. When the plants have acquired a few inches growth, they should be removed into separate small pots filled with light sandy earth, replunging them in the bark-bed, and giving a little water, with proper shade. They afterwards may be placed so as to have pretty free air, but be constantly kept in the stove.

They afford variety among other stove plants.

LAYER, the young shoot or branch of such trees as are capable of being raised by being laid into the ground. It is the part which is placed in the earth in order to strike root.

LAYING, the operation of placing layers in the soil. It is a method adapted to most sorts

of trees and shrubs, and many herbaceous plants. It is effected by laying branches and young shoots of trees and plants in the earth, from two or three to five or six inches deep, leaving their tops out, that the part layed in the earth may emit roots, and become a plant. The layers, when rooted, should be separated from the parent, and planted in the nursery, or other proper place, to acquire due strength and size, for the purposes for which they are designed.

They require different lengths of time for becoming rooted, from a few months to two or more years.

Numbers of shrubs and trees are increased by layers, but the practice is more particularly applicable to the shrub kind; as their branches grow near the ground, convenient for being laid down. It may, however, be practised with success on fruit-trees and forest-trees, when their branches are situated low enough for being laid, though the varieties of many fruit-trees are better propagated by grafting and inoculation. The vine and fig, however, often admit of being increased by layers; and forest-trees, for the continuance of varieties; as the plants raised in this method continue exactly the same as the parent plant from whence they were raised. This is a certain method to continue any approved variety, as well as to increase such shrubs or trees as do not produce seeds here, and which cannot be easily obtained. It is likewise an expeditious and easy mode of propagation; as by it many new plants are often raised in a few months, which would take two or three years to bring them to the same size from seed. In many sorts it is so easy that all the shoots of any branch situated near the ground, or convenient for laying down, may be made distinct plants.

For all sorts of the tree or shrub kinds, it is generally performed on the young shoots of the preceding summer, which should be laid down in spring or autumn; but sometimes on shoots of the same year, in summer, especially in the hard-wooded evergreen trees and shrubs, that do not strike root readily in the older wood. Many sorts of trees that have their wood of a soft loose texture often grow pretty freely by Layers of them, of two or several years growth.

In herbaceous plants capable of being propagated by layers, such as carnations, pinks, double sweet-williams, &c. the young shoots of the same year, laid down in June and July, are commonly the most successful.

The season for performing this sort of work, in most sorts of trees and shrubs, is autumn and spring, though it may be performed at almost any time of the year.

Many kinds of under-shrubby and herbaceous plants also succeed, if layed any time in spring or summer till the end of June; though that and the following month are the most successful for the herbaceous tribe, as carnations and others usually propagated by laying, as they then root the same season in from three or four to five or six weeks, so as to be proper for transplanting.

When it is intended to lay trees or shrubs that naturally run up to stems, without furnishing any considerable quantity of lower branches for laying, a sufficient number of strong plants should be set in the nursery, at proper distances, and headed down in the autumn or spring after, within a few inches of the ground, that they may throw out a good quantity of young shoots the following summer, near the earth, so as to be convenient for laying down in the succeeding autumn; or, by waiting another year many more shoots for the purpose of layers will be provided, by the first shoots throwing out many lateral ones, each of which when layed will form a plant. And on the layers being rooted, and all cleared away, the stool remaining will furnish another crop of shoots for laying next year, and the same in succession for many years.

When layers are wanted from trees that are grown up, and whose branches are at a distance from the ground, a temporary stage or scaffold is erected, on which pots or tubs of mould are placed to receive the layers.

The general method of merely laying the branches or shoots in the earth, is practised for all sorts; but previous to laying, they are often prepared in different ways to facilitate their rooting, according as the trees of different natures require; as by simple laying, twisting, slitting, cutting the bark, piercing the shoot, wireing, &c.

Simple Laying.—This is merely laying the shoots in the earth, as directed below, without any previous preparation of twisting, slitting, &c. and is sufficient for a great number of trees and shrubs of the soft-wooded kinds; but for such as do not readily root by this simple method, recourse must be had to some of the following ways.

Twisting the Layer.—By giving the shoot a gentle twist in the part designed to be layed in the ground, it greatly promotes and facilitates the emission of fibres from the bruised part.

Slitting or Tonguing the Layer.—This is the most universal and successful mode, where any preparation of the shoot is necessary to promote its rooting; it is performed by slitting the shoot at a joint underneath, up the middle, half an inch or an inch or more long, according to the size and nature of the layer, forming a sort of tongue nearly the same as directed for

carnation layers; laying that part in the earth, and raising the top upright, or rather pointing inwards, so as to separate the tongue of the slit from the other part, and keeping the slit open, as directed below.

Cutting the Bark.—This is performed by cutting the bark all round at a joint, taking out small chips all the way below the cut, and laying that part in the earth, by which it readily emits roots.

Piercing the Layer.—This is done by thrusting an awl through the shoot, at a joint, in several places, laying that part in the ground, by which it will emit fibres from the wounds more readily.

Wireing the Layer.—This is by twisting a piece of wire hard round the shoot at a joint, and pricking it with an awl on each side of the wire in several places, laying it in the earth, by which it breaks out into roots at the confined and wounded parts; often proving successful in such trees and shrubs as do not readily emit fibres by the other methods.

By some of these methods almost all sorts of trees and shrubs may be propagated.

The general method of laying all sorts of trees or plants, either by simple laying, or any of the other methods, is the following.

The ground about each plant must be dug for the reception of the layers, making excavations in the earth to lay down all the shoots or branches properly situated for the purpose, pegging each down with a hooked stick, laying also all the proper young shoots on each branch or main shoot, fixing each layer from about three or four to six inches deep, according as they admit, and directly moulding them in that depth, leaving the tops of every layer out of ground, from about two or three to five or six inches, according to their length, though some shorten their tops down to an eye or two only above the earth, raising the top of each layer somewhat upright, especially the slit or tongued layers, to keep the slit part open. As all the layers of each plant or stool are thus layed, all the mould should be levelled in equally in every part, close about every layer, leaving an even smooth surface, with the top of each layer out.

It sometimes happens that the branches of trees are so inflexible as not to be easily brought down for laying; in which case they must be plashed, making the gash or cut on the upper side; and when they are grown too large for plashing, or the nature of the wood will not bear that operation, they may be thrown on their sides, by opening the earth about the roots, and loosening or cutting all those on one side, that the plant may be brought to the ground, to admit of the branches being laid down into the earth.

When layers are to be made from green-house shrubs, or other plants in pots, the work should generally be performed in pots, either in their own, or others placed for that purpose.

After laying in either of the above methods, there is no particular culture necessary, except in the heat of summer giving occasional waterings to keep the earth moist about the layers, which will greatly forward them, and promote a good supply of roots against autumn, when those that are properly rooted should be taken off and transplanted.

The layed branches or shoots should be examined at the proper season, October and November, and those that are rooted be cut from the mother plant, with all the root possible, planting them out in nursery rows, a foot or two asunder, according to their nature of growth, there to remain till of due size for their several purposes; but those of the tender kinds must be potted, and placed among others of similar nature and growth.

When the layers are all cleared from the stools or main plants, the head of each stool, when to be continued for furnishing layers, should be dressed; cutting off all decayed and scraggy parts, digging the ground about them, working some fresh mould in close about their heads, to refresh and encourage their producing a fresh supply of shoots for the following year's laying down.

LEATHERWOOD. See DIRCA.

LEDON. See CISTUS.

LEDUM, a genus containing plants of the hardy evergreen kind. The Marsh Cistus, or Wild Rosemary.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a one-leafed perianthium, very small, five-toothed: the corolla one-petalled, flat, five-parted: divisions ovate, concave, rounded: the stamina have ten filiform filaments, spreading, length of the corolla: anthers oblong: the pistillum is a roundish germ: style filiform, length of the stamens: stigma obtuse: the pericarpium is a roundish capsule, five-celled, gaping five ways at the base: the seeds numerous, oblong, narrow, sharp on each side, extremely slender.

The species cultivated is *L. palustre*, Marsh Ledum.

It has a branched root, running widely and deeply into the ground: the stems are shrubby, slender, three or four feet long, dividing into simple branches, and covered with a brown bark, which is tomentose or villose whilst they

are young, but afterwards becomes smooth: the leaves are linear-lanceolate, dusky green above, and smooth, underneath covered with a brown pile, quite entire, resembling those of Rosemary, but wider, petioled, and perennial: the flowers are on peduncles an inch or more in length, nodding before and after flowering, whitish, in axillary bundles or corymbs: the capsule small, obovate, terminated by a long permanent style: valves coriaceous: partitions membranaceous, springing from the edges of the valves, doubled, opening at their inner angle by a longitudinal chink: the receptacles five, filiform, curved a little, springing from the upper part of the axis of the fruit, and hanging down freely in the cavity of the cells. It is a native of the north of Europe, flowering in April and May.

It varies with erect and decumbent branches.

Culture.—These plants are increased by sowing the seeds in pots filled with boggy earth, or in shady borders of the same kind of mould, in the spring season.

But the best method is to take up the plants in their native situations, with balls of earth about their roots, and plant them in borders of the above kind, keeping them well watered.

Layers of the young shoots sometimes will grow.

They afford variety in shady situations, where the soil is of the boggy kind.

LEEKS. See ALLIUM.

LEMON TREE. See CITRUS.

LEPIDIUM, a genus containing a plant of the herbaceous annual kind.

It belongs to the class and order *Tetradynamia Siliculosa*, and ranks in the natural order of *Siliquosæ* or *Cruciformes*.

The characters are: that the calyx is a four-leaved perianthium: leaflets ovate, concave, deciduous: the corolla four-petalled, cross-shaped: petals obovate, twice the length of the calyx, with narrow claws: the stamina have six awl-shaped filaments, length of the calyx, the two opposite ones shorter: anthers simple: the pistillum is a heart-shaped germ: style simple, length of the stamens: stigma obtuse: the pericarpium is a silicle, heart-shaped, emarginate, compressed, sharp on the margin, two-celled: valves navicular, keeled, opposite the lanceolate dissepiment: the seeds ovate-acuminate, narrower at the base, nodding.

The species cultivated is *L. sativum*, Garden or Common Cress.

Other species may be cultivated for variety.

It has an annual, white, fusiform, slender root: the stem upright, round, smooth, from a foot to two feet in height, branched at top: both stem and branches terminated by loose narrow spikes of flowers: the leaves oblong, alternate, pinnate, the pinnas of the lower multifid, of the upper more entire, linear or lanceolate: the flowers small: the calyx very small, greenish: the petals white, larger than the calyx: the silicle roundish, without any style: the valves winged: the seeds small, rufescent, ovate, marked with lines, having a sharp taste like Mustard. Its native place is unknown.

There are several varieties, as with broad leaves, with curled leaves, and the common sort with the leaves multifid.

Culture.—These plants are raised by sowing the seed as wanted for use, at different times of the year, as once a week or fortnight, where a constant succession of small herbs in their young growth is wanted for sallads, when only a few days or a week or two old; or where a constant supply of those small herbs are required in their young seedling growth, some should, as has been observed, be sown in succession every week or fortnight at furthest, all spring, summer, and autumn; and once a fortnight in the winter season.

The order of sowing them in the different seasons is; in a warm south border or other similar situation, or under a frame, &c. in the early spring months; and as the warm season advances, in any open compartment, all in as light earth as the garden affords; but in summer, or hot dry weather, in somewhat shady borders, or in a free situation, shaded with mats from the scorching sun, and daily watered; and in winter in the warmest situation, or in shallow frames defended with lights, and under hand glasses: but in frosty or other very cold weather, in that season, on moderate hot-beds; and hot-bed sowings are also requisite during the colder part of the spring, or at any time in cold seasons, where a supply of these and other small-sallad herbs are required to be raised as quickly as possible.

The method of sowing the seed in all cases is very thick, as the plants are mostly used in small young growth, and mostly in small, flat, shallow drills, about three inches asunder, so thick as almost to cover the earth, being lightly earthed over a quarter of an inch thick, or less; or on the plain surface, first raking it smooth, then sowing the seed thick as above, smoothing it down with the back of the spade, and either with the spade spreading some fine earth lightly over it as thinly as possible, or covering it by sifting earth over it evenly a small depth, just to cover all the seed properly. This sort of sallad herb should always be cultivated so as to grow as rapidly as possible, being cut while perfectly young. See SMALL SALLAD HERBS.

LETTUCE. See LACTUCA.

LEUCOJUM, a genus containing plants of the bulbous-rooted flowery perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Spathaceæ*.

The characters are: that the calyx is an oblong, obtuse, compressed spathe, gaping on the flat side, withering: the corolla is bell-shaped-expanding: petals six, ovate, flat, conjoined at the base, with the tips thickish and stiffish: the stamina have six setaceous filaments, very short: anthers oblong, obtuse, quadrangular, upright, distant: the pistillum is a roundish inferior germ: style clavate, obtuse: stigma setaceous, upright, sharp, longer than the stamens: the pericarpium is a top-shaped capsule, three-celled, three-valved: the seeds several, roundish.

The species cultivated are: 1. *L. vernum*, Great Spring Snow-drop; 2. *L. æstivum*, Summer Snow-drop; 3. *L. autumnale*, Autumnal Snow-drop; 4. *L. strumosum*, Many-flowered Cape Leucojum.

The first has an oblong bulb, shaped like that of the Daffodil, but smaller: the leaves are flat, deep green, four or five in number, broader and longer than those of the Common Snow-drop: the scape angular, near a foot high, hollow and channelled: towards the top comes out a whitish sheath, opening on the side, out of which come out two or three flowers, hanging on slender peduncles: the corolla is much larger than that of the Common Snow-drop; and the ends of the petals are green. They appear in March, and have an agreeable scent, not much unlike those of the Hawthorn.

The flowers, which at first sight resemble those of the Common Snow-drop, are easily distinguished by the absence of the Three-leaved Nectary: they do not come out so soon by a month. It is called by Mr. Curtis, *Spring Snow-flake*. It is a native of Italy, &c.

The second species has a bulb the size of a Chestnut, somewhat ovate, outwardly pale brown, inwardly white; coats numerous, thin, and closely compacted. But Miller asserts, that it is nearly as large as that of the Common Daffodil, and very like it in shape: that the leaves also are not unlike those of the Daffodil, more in number than in the first, and keeled at the bottom, where they fold over each other, and embrace the stalk: the leaves are about a foot and half in length, upright, nearly linear, almost an inch in breadth, obtuse; the lower ones shortest: the scape a little higher than the leaves, hollow, slightly flatted, two-edged, a little twisted, one side sometimes obtuse, the other acute: the peduncles for the most part five from the same sheath, each supporting a single flower, angular, and of unequal lengths: the flowers are pendulous, growing all one way, having little scent: the petals are white, finely grooved within, not at all uniting at bottom; the tips thickish, a little puckered, and marked with a green spot. The flowers appear at the end of April or the beginning of May, and there is a succession of them during three weeks, or longer in cool weather. It is a native of Hungary, &c.

To distinguish it from Galanthus, Mr. Curtis names it *Summer Snow-flake;* and in gardens it is known by the name of *Great Summer Snow-drop; Late* or *Tall Snow-drop*.

The third has a thick bulb for the size of the plant, composed of many glutinous coats, bitter, covered with a whitish membrane: the scape slender, brownish, a hand in height, supporting two or three small white flowers (sometimes only one), hanging down, having no smell. It is distinguished by its four or five capillary leaves; which begin to spring up after the flower is past, when the seeds are ripening, and sometimes after the heads are ripe. They abide all the winter and spring following, and wither away in the beginning of summer; leaving the scape to appear naked: the flowers are a little reddish at the bottom next the stalk. It is a native of Portugal, flowering in September.

The fourth has a roundish white bulb, less than a hazel nut: the leaves two or three, inclosed at the base in a white sheath, filiform, dotted with white, keeled at bottom, flat, or a little convex on the back, weak, and more or less lying on the ground: scape flexuose-erect, slender, about half a foot high, roundish, terminated by a spreading umbel of from three to seven flowers: the valves of the spathe lanceolate, acute, membranaceous, opposite, sometimes equal, sometimes not, pale: the peduncles filiform, one-flowered, unequal, from one to two inches in length: flowers without scent, coming out successively: petals white within, purplish without, oblong, lanceolate, three lines in length; the three inner bluntish; the three outer acute, with a blunt, greenish keel: anthers purple: germ three-cornered, green: style white, swelled out at bottom into a body larger than the germ, plaited at bottom; thence awl-shaped, bluntly three-cornered, the length of the stamens: stigma obscurely trifid: capsule subglobular, three-cornered: the whole plant is smooth. It is a native of the Cape, flowering in November.

Culture.—These plants are readily increased by off-sets from the roots, which should be separated from the old roots about every third year, in the summer season, as soon as their leaves begin to decay, in the same manner as other bulbous roots. See BULBOUS ROOTS.

They may also be increased by seeds, which should be be sown in the latter end of August, in a border of light bog earth. The plants should remain in this situation till the second summer, and be then taken up at the proper period and planted in beds, till they begin to flower, when they should be removed into the borders. In this way they are three or four years before they flower.

The best method is, to procure the roots from the nurserymen, and plant them in the beginning of the autumn, in an eastern or northern border, where the soil is of a boggy quality, in patches of three or four together, in the fronts, putting them in to the depth of about three or four inches.

The off-sets should be planted out in beds a year or two after being taken off, till fit to be set out for flowering.

A soft loamy soil, or a mixture of loam and bog earth, are the most suited to their healthy growth. The last sort requires protection in the house with other Cape bulbs.

By planting them in the different aspects mentioned, a longer succession of flowers may be produced.

They are very ornamental in the fronts of the borders, or the sides of the lawns, and other parts near the house.

LIGHT, a subtile fluid highly necessary to the healthy growth and vigour of plants.

The author of the Philosophy of Gardening remarks, that the contest for light as well as for air, which is so visible in the growth of vegetables, shows the former to be of great consequence to their existence, as well as the latter. "Thus," says he, " many flowers follow the sun during the course of the day, by the nutation of the stalks, not by the rotation of them, as observed in the Sunflower, by Dr. Hales, and the leaves of all plants endeavour to turn their upper surfaces to the light, which is their respiratory organ, or lungs. The great use of all plants turning the upper surfaces of their leaves to the light, is thus rendered intelligible; the water perspired from those surfaces is, he conceives, hyperoxygenated; and, as it escapes from the sharp edges of the mouths of the perspiring vessels, when acted upon by the sun's light, gives out oxygen; which oxygen thus liberated from the perspired water, and added to that of the common atmosphere, presents to the respiratory terminations of the pulmonary vessels on the upper surfaces of leaves, an atmosphere more replete with vital air. This necessity of light to the respiration of vegetables is so great, he thinks, that there is reason to believe that many plants do not respire during the night, but exist in a torpid state, like winter-sleeping insects. Thus the *Mimosa*, Sensitive Plant, and many others, close the upper surfaces of their opposite leaves together during the night, and thus preclude them both from the air and light; and the internal surfaces of innumerable flowers, which are their respiratory organs, are closed during the night, and thus unexposed both to light and air.

" It is however observed, that the *fungi*, which are termed vegetables because they are fixed to the earth, or to the stones, or trees, or timber, where they are found, can exist without light, or much air, as appears in the truffle, which never appears above ground; and by other *fungi*, which grow in dark cellars; and in esculent mushrooms, which are cultivated beneath bed sof straw."

The etiolation or blanching of vegetables also depends upon keeping the light from them.

It is further contended, that " the element of light, as well as that of heat, is necessary to vegetation. In this climate they both seem in general to be injurious only by their defect, and seldom by their excess. But as light acts as a stimulus on the more irritative or sensitive parts of plants, which appear by the expansion of many flowers, and of some leaves, when the sun shines on them, and by the nutation of the whole flower, as of the Sun-flower (Helianthus), and by the bending of the summits of all plants confined in houses towards the light; there may be diseases owing to the excess of this stimulus, which have not been attended to; to prevent which, the flowers of *Tragopogon*, Salsafi, and of other plants, close about noon. Other unobserved diseases may be owing to a defect of the stimulus of light; as a *Mimosa*, Sensitive Plant, which had been confined in a dark room, did not open its foliage, though late in the day, till many minutes after it was exposed to the light." The excess of light has not, however, been observed to be attended by vegetable diseases in these more northern latitudes.

Experience has shown its infinite service to the growth of vegetables, contributing exceedingly to facilitate their vegetation, and increase their perfection and duration; as it is obvious that most plants are considerably more prosperous, and attain greater perfection, in a free exposure fully open to the light and air, than in shady places; the same is observed of fruits. Those growing in a situation full to the light of the sun, are in general more large and fair, ripening sooner, and more perfectly, as to beauty and richness of flavour, than such as grow in the shade: these reasons should therefore determine us to cultivate most of the principal plants and fruits in situations open as much as possible to the full light and influence of the

sun; though upon particular occasions, in the heat of summer, shady places may be necessary for some sorts of plants; though not where shaded and darkened by spreading trees, &c. but a border open above to the full light, and only shaded from the immediate rays of the sun. For the general crops, a perfectly open, sunny, light situation, free from the shade of spreading trees, is always the most proper.

Its utility is very evident, from plants growing in garden-frames, green-houses, &c. in winter, when, in time of severe weather, covers or shutters have been continued long over the glasses, so as to exclude the rays of light, becoming sickly, growing pale, and assuming an unhealthy appearance for a long time; the leaves often either decaying or dropping off; and frequently when the covers are continued very long without the admission of light, the whole plant in many sorts gradually dwindles and perishes. Great attention is of course requisite in this case, when, from the severity of the weather, the use of other covers besides the glasses is necessary, to take every opportunity of a favourable day, or even an hour or two of a day, to admit the light as fully as possible.

The same is also the case with plants in early hot-beds, such as Cucumbers, Melons, &c. which, early in the year, require a covering of mats over the glasses every night; as when these additional covers are applied too soon in the afternoon, and continued late in the morning, so as to keep the plants long in darkness, it is highly disadvantageous to their growth, causing them to grow weak, pale, and sickly.

As light is, therefore, so beneficial to plants in general, it should be increased as much as possible to those in frames, green-houses, stoves, &c. In these situations it may be useful to paint the inside of all such departments white, to reflect the rays of light as much as possible, and particularly in the nights, and in day-time when the severity of the season requires covers or shutters to be placed over the glasses.

LIGHTS, a term applied to the moveable glazed sashes which cover garden-frames; and which, according to the number of lights, or separate moveable glasses, are denominated one-light, two-light, and three-light frames; these being the general different sizes of garden-frames. See FRAME.

LIGUSTICUM, a genus containing plants of the herbaceous, biennial, and perennial kinds.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ* or *Umbelliferæ*.

The characters are: that the calyx is an universal umbel, manifold: partial manifold: involucre universal membranaceous, seven-leaved, unequal: partial scarcely four-leaved, membranaceous: perianthium proper five-toothed, obscure: the corolla is universal uniform: florets all fertile: proper of five petals, which are equal, involute, flat, entire, inwardly keeled: the stamina have five capillary filaments, shorter than the corolla: anthers simple: the pistillum is an inferior germ: styles two, approximated: stigmas simple: there is no pericarpium: fruit oblong, cornered, five-furrowed, bipartite on each side: the seeds two; oblong, smooth, marked on one side with five elevated striæ, flat on the other side.

The species cultivated are: 1. *L. levisticum*, Common Lovage; 2. *L. Scoticum*, Scotch Lovage; 3. *L. Austriacum*, Austrian Lovage.

The first has a strong, fleshy, perennial root, striking deep into the ground, and composed of many strong fleshy fibres covered with a brown skin, and having a strong hot aromatic smell and taste: the leaves are large, composed of many leaflets shaped like those of Smallage, but larger, and of a deeper green: the stems six or seven feet high, large and channelled, dividing into several branches, each terminated by a large umbel of yellow flowers. It is a native of the Alps of Italy, &c. flowering in June and July, and the seeds ripening in autumn.

The second species has a biennial root, (perennial) of much less size than the preceding: the leaflets are broader and shorter; each leaf having two or three ternate leaflets, indented on their edges: the stalk rises about a foot high, and sustains a small umbel of yellow flowers, shaped like those of the preceding. It is a native of Scotland, North America, &c.

The third has a root half a foot long or more, the thickness of the human thumb, often branched, yellowish brown on the outside, pale within and spongy: the stem upright, from two to three feet in height, grooved, hollow without any partitions at the joints, the whole leafy, as thick as the thumb or finger, simply branched at top only: the root-leaves very large; the stem-leaves above the middle sessile: the leaflets of the general involucre lanceolate, acute, pale green with a whitish membranaceous edge, about half the length of the umbel, reflex, entire, or variously gashed; of the partial involucre about six, all commonly quite entire, the outer equalling the umbellets, and not bent back: terminating umbel of about forty rays, from four to seven inches in diameter: the rest much smaller; all close: these, which are at the tops of the branches, flower later, and gradually exceed the primary umbel in height, surrounding it when in fruit: the flowers are strong-

smelling, large, all fertile. It is a native of Austria, &c. flowering from June to August.

Culture.—These plants are increased by sowing the seeds either in the places where they are to remain, or in beds of light earth, in the autumn or spring, but the former is the better method, raking them lightly in. When the plants have attained a few inches growth, they should be removed from the beds into other beds, where the soil is moist, and set out two feet apart each way, and in the autumn those for the border removed into them; but the above is the better practice.

The plants sown where they are to grow, should be thinned out in the spring, and be kept clean from weeds.

They may be admitted in large borders for the purpose of variety. The first is also used as a medicinal plant.

LIGUSTRUM, a genus containing a plant of the hardy deciduous and evergreen shrubby kind—Privet.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Sepiariæ*.

The characters are: that the calyx is a one-leafed, tubular perianthium, very small: mouth four-toothed, erect, obtuse: the corolla one-petalled, funnel-form: tube cylindric, longer than the calyx: border four-parted, spreading: divisions ovate: the stamina have two filaments, opposite, simple: anthers upright, almost the length of the corolla: the pistillum is a roundish germ: style very short: stigma two-cleft, obtuse, thickish: the pericarpium is a globose berry, smooth, one-celled: the seeds four, convex on one side, cornered on the other.

The species cultivated is *L. vulgare*, Common Privet.

It is a shrub, usually about six feet in height, branched, the bark of a greenish ash-colour, irregularly sprinkled with numerous prominent points: branches opposite, the young ones flexible and purplish: the leaves opposite, on very short petioles, smooth on both sides, perfectly entire, the lower ones at the bottoms of the small branches least: the panicle about two inches in length, close and somewhat pyramidal; branches and pedicels appearing villose when magnified: the corolla white, but soon changing to a reddish-brown: the flowers are sweet-scented: berry superior, fleshy, subglobular, shining, of so dark a purple as to seem black: it is found wild in most parts of Europe, &c. flowering in July, and the berries ripening in autumn.

There are several varieties; as with the leaves in threes and enlarged at the base, with silver-striped leaves, with gold-striped leaves, with white berries; and Evergreen or Italian Privet, which rises with a stronger stem, the branches less pliable, and grows more erect; the bark is of a lighter colour; the leaves much larger, ending in acute points, of a brighter green, and continue till they are thrust off by the young leaves in the spring: the flowers are rather larger, and are not often succeeded by berries in this climate.

The chief use of the common sort is to form such hedges as are required in dividing gardens for shelter or ornament; and for this the Italian or Evergreen kind is usually preferred: it bears clipping well, is not liable to be disfigured by insects, and having only fibrous roots, it robs the ground less than almost any other shrub: it is one of the few plants that will thrive in the smoke of large towns, though it seldom produces any flowers in the closer parts after the first year: it also grows well under the drip of trees and in shade: the *Sphinx Ligustri*, or Privet Hawk Moth, and *Phalæna Syringaria*, feed on it in the caterpillar state, and *Meloe vesicatorius*, *Cantharides* or Blister Beetle, is found on it. From the pulp of the berries a rose-coloured pigment may be prepared: with which, by the addition of alum, they dye wool and silk of a good durable green: for which purpose they must be gathered as soon as they are ripe.

Culture.—These plants are capable of being increased by seed, layers, suckers, and cuttings; but the first method affords the best plants: the seed should be sown in autumn, in a bed of common earth an inch deep, or in drills the same depth; but as they do not always grow freely the first year, they may be buried till next autumn, in pots of sandy earth, in the ground, and then sown as above: when the plants come up they should be kept well weeded, and, when a year or two old, be planted out in nursery-rows, to remain two or three years, then removed where they are wanted to remain: the layers should be laid down, from some of the pliable young branches, in the earth, in autumn or winter, when they will be well rooted by the autumn following; then take them off from the stool, with their roots, and plant them in the nursery for a year or two, or till of proper size for the purposes they are intended for: the suckers which rise annually from the roots should be taken up in autumn, winter, or spring, with roots, and planted in the nursery as above: the cuttings of the young shoots, eight or ten inches long, should be planted in the autumn, in a shady border, where they will be properly rooted by the following autumn, when they may be planted out in nursery rows, to acquire proper growth, in the manner directed above. The varieties with striped leaves may be increased by budding, or inarching, upon the plain

sort; or by laying down the branches,—but they seldom shoot so fast as to produce branches proper for this purpose; and being more tender, they should have a dry soil and a warm situation: in a rich soil they soon lose their variegation, and become plain. The Italian or Evergreen sort, which is now generally found in the nurseries, is equally hardy, and thrives in almost any situation: it is increased in the same manner; but as it seldom produces berries in this climate, they must be procured from the place of its native growth.

The plants, besides their use as above, may be introduced in the shrubberies and other parts, by way of variety, especially the Evergreen sort.

LILAC. See SYRINGA.

LILIUM, a genus containing plants of the bulbous-rooted flowery perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Coronariæ*.

The characters are: that there is no calyx: the corolla is six-petalled, bell-shaped, narrowed beneath: petals upright, incumbent, obtusely carinated on the back, gradually more expanding, wider; with thick, reflex, obtuse tips: nectary, a longitudinal, tubular line, engraven on each petal from the base to the middle: the stamina have six awl-shaped filaments, upright, shorter than the corolla: anthers oblong, incumbent: the pistillum is an oblong germ, cylindric, striated with six furrows: style cylindric, length of the corolla: stigma thickish, triangular: the pericarpium is an oblong six-furrowed capsule, with a three-cornered, hollow, obtuse tip, three-celled, three-valved; the valves connected by hairs disposed in a cancellated manner; the seeds are numerous, incumbent in a twin order; flat, outwardly semi-orbicular.

The species cultivated are: 1 *L. candidum*, Common White Lily; 2. *L. Catesbæi*, Catesby's Lily; 3. *L. bulbiferum*, Bulb-bearing or Orange Lily; 4. *L. Martagon*, Purple Martagon Lily, or Turk's Cap; 5. *L. Pomponium*, Pomponian Lily; 6. *L. chalcedonicum*, Scarlet Martagon Lily; 7. *L. superbum*, Great Yellow Martagon Lily; 8. *L. Canadense*, Canada Martagon Lily; 9. *L. Camschatcense*, Kamtschatka Lily; 10. *L. Philadelphicum*, Philadelphian Martagon Lily.

The first has a large bulb, from which proceed several succulent fibres: the stem stout, round, upright, usually about three feet in height: the leaves numerous, long, narrow-pointed, smooth, sessile: the flowers large and white, terminating the stem in a cluster on short peduncles: the petals within of a beautiful shining white; on the outside ridged and less luminous. It is a native of the Levant, flowering in June and July.

The principal varieties are; with striped flowers, or with blotched purple flowers, or with variegated striped leaves, or with yellow-edged leaves, with double flowers, and with pendulous flowers.

The first of these varieties is now become common; but the purple stain giving the flower a dull colour, the common white is generally preferred: the second is chiefly valued for its appearance in winter and spring; for the leaves coming out early in the autumn, spreading themselves flat on the ground, and being finely edged with a broad yellow band, make a pretty appearance during the winter and spring months, as it flowers earlier than the plain sort: the third is of little value, as the flowers never open well unless they are covered with glasses, nor have they any of the rich odour of the common sort: the fourth came originally from Constantinople; the stalk is much more slender; the leaves narrower and fewer in number; the flowers not quite so large, and the petals more contracted at the base; they always hang downwards; the stalks are sometimes very broad and flat, appearing as if two or three were joined together: when this happens, they sustain from sixty to one hundred flowers, and sometimes more; this however is merely accidental, as the same root scarcely ever produces the same two years together.

The second species is one of the least of the cultivated sorts, the whole plant when in bloom being frequently little more than a foot high; in its native soil it is described as growing to the height of two feet: the stalk is terminated by one upright flower: it is purple, slender, upright, round, smooth with a slight glaucous bloom on it, solid, stiffish: the root-leaves few, often only on the barren plant, on long petioles: the stem-leaves are numerous, alternately scattered, sessile, curved back, narrow-lanceolate, the upper ones gradually more ovate-lanceolate, quite entire, blunt with a purple tip, even on both sides, slenderly nerved, flat, a little fleshy, shrivelling: the flower has no scent, but is said by Catesby, to be variously shaded with red, orange, and lemon colours: it is remarked by Mr. Curtis, that it varies considerably in the breadth of its petals, in their colour and spots; and that it flowers usually in July or August.

The third has a subovate bulb in its native state, consisting of thick white loosely imbricate scales, putting out a few thick fibres from the bottom: the stem upright, a foot and half high, striated-angular, smooth or slightly hairy, with numerous scattered leaves, the upper ones spread-

ing out horizontally, acute, quite entire, obsoletely hirsute, a little rough to the touch, dark green, slightly nerved, sessile, lanceolate-linear, three or four inches long; each, excepting the lower, frequently producing a roundish and shining pale-green bulb or two in the axil: the peduncle terminating, round, thick, somewhat villose; either solitary, or two, three or four together, forming a sort of umbel; some naked, others having a bracte or two: the flower without scent, red-orange within, pale-orange on the outside. It is a native of Austria, &c.

There are varieties with double flowers, with variegated leaves, with smaller stems, and the bulb-bearing fiery Lily, which seldom rises more than half the height of the others: the leaves are narrower: the flowers smaller, and of a brighter flame-colour, few in number and more erect; they come out a month before those of the common sort, and the stalks put out bulbs at most of the axils, which, if taken off when the stalks decay, and planted, produce plants.

The sub-varieties are: the great broad-leafed, the many-flowered, the small, and the hoary bulb-bearing Lily.

The fourth species rises with a strong stalk from three to four feet high: the leaves are broad; the flowers dark purple, with some spots of black; they are produced in loose spikes, appear in June, and have a disagreeable odour when near, but not so offensive as the seventh sort: the bulb is, according to Martyn, composed of lanceolate, yellow, loose scales, with thick, long, whitish fibres at bottom: the stem straight, round, shining, from a foot and a half to four feet in height, at the top of the bulb furnished with rooting fibres in whorls, pale green at bottom, the rest having black spots scattered over it, above and below the leaves are scattered, but in the middle they are in whorls; lanceolate, acute, somewhat nerved, quite entire, subpetioled; the stem terminates in a loose raceme, many-flowered, few-flowered, or sometimes one-flowered only: the peduncles purple, dotted with black, with lanceolate sharp bractes, two to the lower, and one to the upper flowers: the petals purple or pale, more or less spotted with black on both sides, the three outer hirsute, with a raised line along the middle. It is a native of the south of Europe, &c.

It varies with white flowers, with double flowers, with red flowers and hairy stalks, and with imperial divided stalks.

The fifth species has a pretty large yellow scaly root, from which arises an upright stalk nearly three feet high, with long narrow leaves, almost triangular, having a longitudinal ridge on their under side; they are deep green, and terminate in acute points; the upper part of the stalk divides into four or five peduncles, each sustaining a single flower of a fine carmine colour, with a few dark spots scattered over it; they appear in July, and, when the season is not hot, continue a considerable time in beauty. It is a native of the Pyrenees, &c.

It varies with double red flowers, with white flowers, with double white flowers, with red spotted flowers, with white spotted flowers, with yellow flowers, with yellow spotted flowers, with early scarlet flowers, and the Major Scarlet Pompony.

The sixth species is from three to four feet in height; the leaves are much broader than those of the fifth sort, and appear as if they were edged with white; they are placed very closely upon the stalks: the flowers are of a bright scarlet, and seldom more than five or six in number: it flowers late in July, and in cool seasons continues in beauty great part of August. It is remarked by Linnæus, that the raceme, before the flowers open, is scarcely curved in, as in the fifth sort, and that the stem is clothed with clustered leaves to the very top. It is a native of the Levant.

According to Mr. Curtis, it varies in the number of flowers, from one to six, and the colour in some is of a blood red: also with deep scarlet flowers, with purple flowers, and with large bunches of flowers.

The seventh has a round stem, very smooth and even, panicled at top, two feet high and more; the branches alternate, divaricating, upright, like the stem, reflex at top, flower-bearing: the stem-leaves alternate, subpetioled, folded together at the base, ovate-oblong, acute, quite entire, smooth, five-nerved beneath, spreading; one flower at the end of each branch: the corollas are large and handsome: the petals oblong, acute, white with large purple spots and smaller black ones from the middle to the base: nectareous keel bearded: according to Catesby the flowers grow alternately on long footstalks, and are of an orange and lemon colour, thick spotted with dark brown; but Miller says they are produced in form of a pyramid, and when the roots are strong there are forty or fifty on a stalk, large, yellow with dark spots, and make a fine appearance, but smell so disagreeably, that few persons can endure to be near them: they appear at the end of June. It is a native of North America.

The eighth species has oblong and large bulbs: the stems from four to five feet high: the leaves oblong and pointed: the flowers large, yellow spotted with black, shaped like those of the orange lily, and the petals not turned back so much as in the other Martagons: they come out

in the beginning of August, and, when the roots are large, in great numbers, making a fine appearance. According to Catesby, on the top of the stem are about twelve pendulous flowers on long arched peduncles, and the petals are reflected very little. It flowers in July and August, and is found in North America.

There is a variety with larger deeper-coloured flowers.

The ninth has a roundish small bulb: the stem quite simple round, even, a foot high: the leaves lanceolate or lanceolate-linear, sessile, four or six, striated, rather blunt, even, upright; two or three of the upper ones usually alternate, narrower: the flowers terminating, few, an inch and a half in diameter, on very short, naked, almost upright peduncles: the petals ovate, blunt, even, striated, purple, not rolled back, attenuated at the base: the filaments shorter by half than the corolla: the anthers upright: the germ triangular and oblong: style none: stigmas three, oblong, curved back, almost the length of the germ. It is a native of Kamtschatka.

The tenth species has a smaller root than in the other sorts, scaly and white: the stem single, upright, near a foot and half high: the leaves in four or five whorls, short, pretty broad, obtuse: the stem terminated by two flowers which stand erect, upon short separate peduncles; they are shaped like those of the bulb-bearing fiery Lily, but the petals are narrower at their base, so that there is a considerable space between them, but upwards they enlarge and approximate, forming a sort of open bell-shaped corolla, but they terminate in acute points: are of a bright purple colour, marked with several dark purple spots towards the base. It flowers in July, and the seeds ripen at the end of September. It is a native of North America.

Culture.—All the sorts are capable of being increased by planting the off-sets of the root, and by sowing seeds to obtain new varieties.

All the sorts of these roots afford plenty of off-sets every year, which when greatly wanted may be taken off annually in autumn; but once in two or three years is better, according as they are wanted; the proper time for which is in summer and autumn, when the flower is past and the stalks decayed, either separating the off-sets from the mother bulbs in the ground, or taking the whole up, and separating all the off-sets, small and great, from the main bulbs; the small off-sets being then planted in beds a foot asunder and three inches deep, to remain a year or two; and the large bulbs again in the borders, &c. singly. The off-sets in the nursery beds may also, after having obtained size and strength for flowering in perfection, be planted out where they are wanted.

The sowing of the seed is chiefly practised for the Martagons to obtain new varieties, which should be done in autumn, soon after the seed is ripe, in pots or boxes of rich light sandy earth, with holes in the bottoms half an inch deep; placing the pots in a sunny sheltered situation all winter, refreshing them at first often with water, and the plants will appear in the spring; when, about April, remove them to have only the morning sun all the summer, giving moderate waterings: in August the bulbs should be transplanted into nursery-beds in flat drills, an inch deep, and three or four asunder; when, as the bulbs will be very small, scatter the earth and bulbs together into the drills, covering them with earth to the above depth; and after having grown in this situation till the August or September following, they should be transplanted into another bed, placing them eight or nine inches each way asunder, to remain to show their first flowers; after which they may be finally planted out into the pleasure-ground.

New varieties of the other sorts may be raised in the same way.

The bulb-bearing varieties may also be increased by the little bulbs put forth from the axils of the leaves without taking up the old bulbs.

The same method of planting and general culture answers for all the different sorts.

The most proper time, as has been seen, for planting and transplanting them is in autumn, when their flowers and stalks decay, which is generally about September, the roots being then at rest for a short space of time, as well as for procuring roots to plant. The bulbs taken up at the above season may be kept out of ground, if necessary, till October or November: the White Lilies, however, do not succeed if kept long out of the earth, and all the others succeed best when planted again as soon as possible. The bulbs of all the sorts are sold at the nurseries.

They should be planted singly, as they soon increase by off-sets into large bunches, disposing them in assemblage in different parts of the borders, and towards the fronts of the principal shrubbery clumps; placing them three or four inches deep, and at good distances from one another, intermixing the different sorts, placing some forward, and others more backward, to effect the greater show and variety.

Some may likewise be planted in separate beds by themselves, twelve or fifteen inches asunder; either of different sorts together, or each in distinct beds, or in separate rows, &c.

After being thus planted out, few of the sorts require any particular culture, as they are capable of enduring all weather at every season. It is however necessary to destroy all weeds; and, as some of them run up with pretty tall slender stalks, to support them with sticks to preserve effectually their upright position, by which their flowers will appear to the best advantage.

Some of the more tender sorts, as the second, fourth, eighth, and tenth species, should, however, be protected in severe winters, by applying tanner's bark or some other similar substance over their roots.

They should all, as has been said, remain undisturbed two or three years, or longer, as by remaining they flower stronger after the first year; and having increased by off-sets into large bunches, many stalks will rise from each bunch of roots, so as to exhibit a large cluster of flowers: it is, however, proper to take up the bulbs entirely every three or four years at least, at the decay of the stalk, to separate the increased off-sets, both for propagation and to disburthen the main roots, and give them room to take their proper growth in.

After being taken up in the autumn, all the sorts should, as just observed, be replanted as soon as possible, especially the White Lily sorts, as they soon begin to emit roots.

They are all valuable as plants of ornament for the beauty of their flowers, which have a noble appearance: they are of course proper ornaments for the pleasure-ground; and when the different sorts are properly intermixed, they effect a most elegant variety, succeeding each other in blow upwards of three months. When wanted particularly for shady or close places, the common White Lily, Orange Lily, and common Martagons, are the most proper, as they thrive under trees. The Orange Lily also answers well in small gardens, in the midst of buildings in towns and cities. Besides planting the different sorts for the beauty of their flowers, many of the striped-leaved White Lily sorts should be placed towards the fronts of the most conspicuous parts for the beauty of their leaves in autumn, winter, and spring, which, if disposed alternately with the Common White Lily, whose leaves are entirely green, a most striking variety will be produced.

The tall-growing sorts are only proper for large borders and clumps, in mixture with other large herbaceous plants.

LILIACEOUS PLANTS, such as resemble those of the Lily kind, in their flowers having six regular petals, in the form of a Lily, or three, or even one petal deeply divided into six segments, assuming a lily-flower form; they have not, however, all flowers so large as that of the Lily, some being considerably smaller; and as the common Lily has no calyx, so several of the liliaceous flowers are also destitute of a cup; and others have cups, which are principally of that sort called a spathe. They may therefore be distinguished into such as have cups and such as have not.

Those without cups are: all the different sorts of common lily; the tulip, all the kinds; fritillary, and crown imperial; hyacinch; star of Bethlehem; bastard star of Bethlehem; tuberose; asphodel; squill; hemerocallis, or day-lily; anthericum, or spider-wort; aloe; yucca, or Adam's needle; gloriosa, or superb lily, &c.

Those with spathes or cups are: the crocus; galanthus, or common snow-drop; leucojum, or great snow-drop; daffodil, narcissus, and jonquil; crinum, or asphodel lily; colchicum; iris, or flower-de-luce; hæmanthus, or blood-flower; gladiolus, or sword-lily; Virginia spider-wort; amaryllis, including the Guernsey lily, belladonna lily, and Jacobæa lily, &c.; pancratium lily, &c.

The greater part of these liliaceous plants of both kinds are bulbous-rooted; some, however, have tuberous and some fibrous roots; and all of them are perennial in root, but annual in stalk.

They are all ornamental garden-flowers, and most of them sufficiently hardy to grow in the open ground; though a few are proper for the green-house and stove. See the different *Genera*.

LILY. See AMARYLLIS, and LILIUM.

LILY-OF-THE-VALLEY. See CONVALLARIA.

LIME TREE. See CITRUS.

LIME WATER, such as is prepared by slaking caustic lime in soft water, in the proportion of half a peck of the former to thirty-two gallons of the latter, letting them remain some time before they are made use of, stirring them well, two or three times a day, for two or three days. This liquid, when the lime has subsided, is found highly useful in clearing fruit-trees from the ravages of the Aphis Puceron, or Vine-Fretter. It should be applied once a day by means of an engine so as to be thrown as much as possible on the under sides of the leaves, and with considerable force, pressing the fore finger upon the end of the pipe, to make it spread like small rain, and taking care that every part of the tree be well watered It should be done as much as possible in cloudy weather, and when the sun is off the walls. Where the trees have an easterly aspect, they may be watered about half past eleven o'clock

in the forenoon, and in a northern one, the first thing in the morning; but in a southern aspect, about four o'clock in the afternoon. And when northerly or easterly winds and frosty nights prevail, it should be discontinued till the weather becomes mild. The trees should always get dry before night, and never be watered when the sun is upon them. Care must likewise be taken that the grounds of the lime be not made use of, as it would make the trees have a disagreeable appearance. See Pucheron and Vine-Fretter.

LIMODORUM, a genus containing plants of the bulbo-tuberous-rooted herbaceous perennial kind.

It belongs to the class and order *Gynandria Diandria*, and ranks in the natural order of *Orchideæ*.

The characters are: that the calyx has vague spathes: spadix simple: there is no perianthium: the corolla, petals five, ovate-oblong, about equal, spreading: the superior ones converging: nectary one-leafed, concave, footstalked, within the lowest petal; the length of the petals: the stamina two: filament an oblong, ascending body, the length of the corolla: anthers two, ovate, looking forwards: the pistillum is a columnar germ, the length of the corolla; inferior: style filiform, growing to the body of the filaments: stigma funnel-form: the pericarpium is a columnar capsule three-valved, one-celled, gaping at the corners: the seeds numerous, saw-dust-like.

The species cultivated are: 1. *L. tuberosum*, Tuberous-rooted Limodorum: 2. *L. altum*, Tall Limodorum: 3. *L. Tankervilliæ*, Chinese Limodorum.

The first has a tuberous root: the stem a foot and half high: the number of flowers not exceeding five, dark purple: in a more luxuriant state it is probably a larger plant, and produces more flowers. It is a native of North America.

The second species has a root shaped like that of the true Saffron, but the outer cover of a darker brown colour; from this come out two or three leaves nine or ten inches long, and near three quarters of an inch broad in the middle, being contracted towards both ends, terminating with long acute points, folding over each other at their base; they have five longitudinal furrows, like the first leaves of young palms: the flower-stalk arises immediately from the root, on one side of the leaves; it is naked, smooth, and of a purplish colour towards the top: it is near a foot and a half high, and terminated by a loose spike of purplish red flowers on short peduncles. The bulb tubercled, roundish, of a fleshy and fibrose substance, covered with a coriaceous shining skin, and having some tomentose white fibres underneath: the leaves from the bulb, vernal, two feet long, broad-lanceolate, longitudinally folded at the nerves, even, very like those of a young plant of the coco palm: scape simple, upright, sometimes subdivided at top, two feet high, even, round; it has little sheaths on it, which are remote, præmorse, embracing, netted, pale: the flowers terminating, scattered, alternate, large, purple, sometimes varying to white. It is a native of the West Indies, flowering in June and July.

The third has a bulb fibrous root, from which proceed three or four oblong, oval, pointed leaves plaited and narrowed at the base, about a foot and a half in length, and seven inches in breadth in the middle part: the flower-stalk rises from the root upwards of two feet in height, and is furnished with a long spike of large beautiful flowers, each consisting of five oblong spreading petals of a pure white on their upper-side, and brown underneath, with a large concave nectarium tinged with red towards the extremity, and succeeded by a three-cornered columnar germen inclosing the seeds. It is a native of China, flowering in March and April.

Culture.—These plants are increased by planting the off-sets from the roots in pots of bog earth, plunging them in the first sort in a mild tan-pit, and in the others in the tan hot-bed of the stove. The proper time of taking them off is when the plants are the most destitute of leaves.

The two last sorts should have a loamy mould, and but little water in the winter season.

The first requires the protection of a good green-house in winter, and the two last must be kept in the bark-bed of the stove.

They afford variety in the green-house and stove collections.

LIMON. See Citrus.

LINING HOT-BEDS, the practice of applying a layer of hot-dung to the sides of the beds to revive and keep up the declining heat. It is essentially necessary in the culture of plants on dung hot-beds in early seasons in winter or spring, until May. As these hot-beds generally in from three or four to five or six weeks, according to their substance, begin to decline in their degree of heat, they require a revival to continue them in regular heat; which in dung hot-beds can only be effected in this manner. It is applied to one or both sides as there may be occasion.

Thus, by the occasional repetition of two, three, or more linings, a hot-bed is continued in a proper degree of heat several months, as exem-

plified in early cucumber and melon hot-beds, which, without the aid of occasional linings, would not retain sufficient heat to forward their respective plants, &c. to proper perfection.

Dung for this purpose must be of the best fresh horse stable kind, moist and full of a steamy lively heat, being prepared in the manner described under HOT-BED, and in proper quantity to make the lining substantial, fifteen or eighteen inches wide, and as high as the dung of the hot bed; as when too slender they do not effect the intended purpose, especially in early beds, or when the heat is considerably decreased.

In early hot-bed work, care should be taken, according to the extent of the bed or beds and season of the year, to allot and reserve a sufficiency of dung for linings: early beds in very cold weather will generally require more substantial and frequent linings than later-made beds in the advanced spring months; and some hot-beds, for slight or temporary uses, just to raise plants for two or three weeks, will sometimes require but very little or no linings. Hot-beds made late, as in the beginning or any time in May, will need but very trifling linings, or some not at all, except in particular uses as when plants are rather backward in growth, the weather cold, and the bed declined much in heat, when, probably, even in May, or beginning of June, a final moderate lining may be necessary.

The requisite linings should be applied to the respective hot-beds in proper time, as it may be necessary on examining the state of heat, not letting them decline too considerably before they are applied, but to continue always a moderately lively heat, but never violent: linings are sometimes applied by degrees, raising them only half way at first, adding more in height in a few days, and thus proceeding till they are raised to the height of the hot-beds.

In the application of linings, it is generally necessary to line only one side at a time, commonly the back part of the bed first; and in a week or fortnight after to line the front side, and both ends if necessary; or in particular cases of the hot-bed having suddenly declined, or been permitted to decrease very considerably in heat before applying the lining, to line both sides moderately at once, about twelve or fifteen inches in width, but only as high as the dung of the bed at first; being afterwards a little augmented by degrees according as the dung of the lining settles.

The general requisite substance of the linings is from twelve to fifteen or eighteen inches width in dung, and as high as the dung of the bed, or sometimes a few inches higher: but for early beds of cucumbers, melons, or other plants of long continuance in hot-beds, they should generally be laid from fifteen to eighteen inches in width at bottom, as conceived necessary, narrowing the width gradually upwards to eight, ten, or twelve inches at top, which may be raised at once to the full height of the dung of the bed, or a few inches higher up the side of the frame, to allow for settling; but with a strong lining, be cautious in raising it much above the dung of the hot-bed, especially when made of very strong, hot, steamy dung, for fear either of its throwing in a too strong heat above to burn the internal earth of the bed, or imparting a copious rank steam to penetrate within the frame, which would steam-scald tender plants.

In general, as soon as the linings are raised to the intended height, it is proper to lay a stratum of earth at top two inches thick, close up to the bed or bottom part of the frame, sloping a little outward to throw off the falling wet of rain, snow, &c. which top covering of earth is essential, both to keep the heat of the linings from escaping too considerably above, in order that it may be directed more effectually to its intended purpose of imparting its whole or principal heat internally to the revival of that of the bed, and prevent the strong steam arising immediately from the rank dung from entering the frame at bottom, or through any small crevice, or at top, when the lights are occasionally raised for the admission of fresh air, as the rancid dung steam thus produced, without being moderated by first passing through a stratum of earth, if it should enter within the frame considerably, would prove very pernicious to most plants, and the total destruction of some kinds.

As the heat of the linings declines to any extent, they must be renewed by a supply of fresh hot dung. This may sometimes be effected by turning over, and shaking up the same dung mixedly together, directly forming it again into a lining: or some of the best or least decayed or exhausted parts of the old lining may only be used, mixing it up properly with a good supply of new dung, applying it immediately in a proper substantial lining as before.

When the dung of the linings is greatly exhausted, fresh dung should mostly be used in the renewal.

Linings of hot dung are sometimes used substantially, in working some sorts of forcing-frames, in raising early flowers and fruits, by applying the dung against the back of the frame, two or three feet in width at bottom, narrowing gradually to a foot and a half, or less, at

the top, raising the whole according to the height of the frame, from four or five to six or seven feet; which heating considerably against the whole back of the frame, communicates the heat internally, by which the different plants are forwarded to early production; supporting the internal heat by renewing the linings. See Forcing Frame.

Linings of dung are also sometimes used in supporting the heat of nursery hot-beds for young pine-apple plants, and some other exotics of the hot-house or stove, both in dung and tan-bark hot-beds, under proper frames and glasses; as well as those wintered in these detached hot-beds distinct from the hot-house, &c. and in which a constant regular heat, almost equal to that of the stove, must be supported, so that, when the natural heat of the bed is on the decline, a strong lining of hot dung must be applied, half a yard or two feet wide below, narrowing moderately upward, and continued on both sides occasionally; and as the heat of these linings subsides, it must be immediately renewed by a supply of fresh dung, either worked up with the best of that of the declined lining, or, if this is much decayed, wholly of new; and thus the hot-beds maintained in a proper degree of heat from autumn till spring.

The decayed dung of the different linings, when done with, becomes excellent manure for the kitchen-garden.

LINUM, a genus containing plants of the herbaceous, annual, and perennial shrubby kinds.

It belongs to the class and order *Pentandria Pentagynia*, and ranks in the natural order of *Gruinales*.

The characters are: that the calyx is a five-leaved lanceolate perianthium, upright, small, permanent: the corolla funnel-form: petals five, oblong, gradually wider above, obtuse, more spreading, large: the stamina have five awl-shaped filaments, upright, length of the calyx (also five rudiments, alternating): anthers simple, arrowed: the pistillum is an ovate germ: styles five, filiform, upright, length of the stamens: stigmas simple, reflex: the pericarpium a globose capsule, rudely pentagonal, ten-valved, gaping at the tip: partitions membranaceous, very thin, connecting the valves: the seeds solitary, ovate-flattish, acuminated, smooth.

The species are: 1. *L. usitatissimum*, Common Flax; 2. *L. perenne*, Perennial Flax; 3. *L. suffruticosum*, Shrubby Flax; 4. *L. arboreum*, Tree Flax; 5. *L. Africanum*, African Flax.

The first has an annual, simple, fibrous, pale brown root: the stem upright, eighteen inches, two feet, and even more in height, round, smooth, leafy, branched only at top: the leaves are sessile, growing close together, almost upright, perfectly entire: the flowers large, growing in a panicle, on round smooth peduncles: the calycine leaflets ovate-keeled, with a membranous edge, when magnified appearing to be fringed with hairs: the petals wedge-shaped, deciduous, sky-blue, streaked with deeper-coloured lines; white at the claws, and somewhat gnawed at the tip. It is a native of Egypt, flowering in June and July.

It may be said to be one of the most valuable plants in the whole vegetable kingdom; as from the bark of its stalks is manufactured flax or lint, for making all sorts of linen cloth; from the cloth, when worn to rags, is made paper: and from the seeds of the plant linseed oil is expressed, which is much used by painters, and in other arts; and the refuse, after expression, forms the oil-cakes so valuable in the fattening of cattle and sheep.

In the second species, from its perennial root rise three or four inclining stalks, having short narrow leaves towards their base, but scarcely any about the top: the flowers are produced at the ends of the stalks, sitting very close; they are blue, and about the size of the cultivated sort, being succeeded by pretty large round seed-vessels, ending in acute points. Its flowers appear from June to August, and are of a delicate texture and very elegant blue colour, and the roots continue four or five years.

There is a variety which is procumbent, with smaller flowers.

The third has a shrubby stalk a foot high, sending out several branches: the leaves very narrow, coming out in clusters, but on the flowering branches broader and longer: the flowers at the ends of the branches, erect, on long slender peduncles: the calyxes acute-pointed: the petals large, entire, white, but before the flowers open pale yellow: they appear in July, but the seeds seldom ripen in this climate: the flowering stalks decay in the autumn, but the lower shrubby part continues with the other branches all the year. It is a native of Spain, &c.

The fourth species forms, if not a tree, as its name implies, a shrub of the height of several feet: it begins to flower in March, and continues flowering to the close of summer; but has not yet produced seeds in this climate. It is a native of the island of Candia.

The fifth has a suffruticose stiff stem, a foot high, round, with simple branches: the leaves are sessile, upright, even, generally shorter than

the internodes: the flowers in a terminating umbel, which is four- or five-cleft, with dichotomous rays: the petals are yellow with villose claws, and turning tawny: the calyx acuminate and rugged at the edge. It is a native of Africa, flowering in June and July.

Culture.—These plants may be increased by seeds and layers, or cuttings.

The two first sorts are raised by sowing the seeds in the early spring months, as March or the following month, the former in fields or plantation-grounds, where the soil is fresh, good, and well reduced into order by frequent digging over, or ploughing and harrowing, in narrow drills, or broadcast, and raked or harrowed in with a light harrow; the plants being afterwards kept perfectly clean from weeds by repeated hoeings.

Towards the end of August, when the plants have attained their full growth, and begin to turn yellow at bottom, and brown at top, and their seeds to ripen, it is proper time to pull them; though, if it were not for the sake of the seed, they might be pulled a little before the seeds ripen, by which the flax is generally better coloured and finer; but if suffered to stand till the seeds are fully ripe, it is commonly stronger, somewhat coarser, and more in quantity. It should be pulled up by handfuls, roots and all, shaking off all the mould; then either spreading them on the ground by handfuls, or binding them in small bunches, and setting them upright against one another, for ten days or a fortnight, till they are perfectly dry, and the seed fully hardened, then housed, and the seed thrashed out, cleaned, and placed in a dry airy situation, being afterwards put up for use. The flax, after being rippled and sorted, should be carried to a pond of nearly stagnant water, being placed in it with the bundles crossing each other in different directions, so as to keep the whole in a close compact state, being kept just below the surface of the water, by proper weights applied upon it. It should remain in this steep till the stems become brittle and the bark readily separates, when it must be taken out and spread thinly on a short pasture, being occasionally turned until it becomes perfectly bleached and dry, when it is in a proper state for the purpose of being converted into flax.

The latter, or perennial sort, should be sown in a bed or border of good earth, in shallow drills at the distance of six inches; and when the plants are two or three inches in height they should be thinned to the same distances, and in autumn be planted out in the places where they are to grow. But it is probably a better practice to sow them at once in the places where they are to grow, thinning them out properly afterwards.

The three other sorts may be best increased by planting cuttings of the branches in pots of light fresh earth, plunging them in the tan hot-bed, or by layers laid down in the later summer months. When the plants in either mode have stricken good root, they may be removed into separate pots, and be managed as other tender exotic plants that require the protection of the green-house.

They may likewise be raised from seeds when they can be procured, which should be sown in pots and placed in a hot-bed in the spring season.

A few plants of the two first sorts may be introduced in the clumps and borders of the pleasure-ground; and the three other sorts afford variety in green-house collections among other potted plants.

LION'S FOOT. See CATANANCHE.

LION'S TAIL. See PHLOMIS.

LIQUIDAMBAR, a genus furnishing plants of the hardy deciduous tree kind.

It belongs to the class and order *Monoecia Polyandria*, and ranks in the natural order of *Coniferæ*.

The characters are: that the male flowers are numerous, on a long, conical, loose ament: the calyx a common four-leaved involucre; leaflets ovate, concave, caducous; the alternate ones shorter: there is no corolla: the stamina have numerous filaments, very short, on a body convex on one side, flat on the other: anthers upright, twin, four-furrowed, two-celled: the female flowers at the base of the male spike, heaped into a globe: the calyx an involucre as in the male, but double: perianthiums proper bell-shaped, cornered, several, connate, warty: there is no corolla: the pistillum is an oblong germ growing to the perianthium: styles two, awl-shaped: stigmas growing on one side, length of the style, recurved, pubescent: the pericarpium has as many capsules, ovate, one-celled, bivalve at the tip, acute, disposed into a globe, woody: the seeds several, oblong, glossy, with a membrane at the point mixed with a great many chaffy corpuscles.

The species are: 1. *L. Styraciflua*, Maple-leaved Liquidambar, or Sweet Gum: 2. *L. imberbe*, Oriental Liquidambar.

In the first, in its native situation, the trunk is commonly two feet in diameter, straight, and free from branches to the height of about fifteen feet; from which the branches spread and rise in a conic form to the height of forty feet and upwards from the ground: the leaves are five-pointed, divided into so many deep sections, (or

sometimes seven,) and set on long slender petioles: they are shaped somewhat like those of the lesser Maple, but of a dark green colour, with their upper surfaces shining: a sweet glutinous substance exsudes through their pores in warm weather, which renders them clammy to the touch. In February, before the leaves are formed, the blossoms begin to break forth from the tops of the branches into spikes of yellowish-red, pappose, globular flowers, which swell gradually, retaining their round form, to the full maturity of their seed-vessels, which are thick set with pointed hollow protuberances, and, splitting open, discharge their seeds. It is a native of North America.

In the second species the leaves have their lobes shorter, and much more sinuated on their borders, ending in blunt points, and not serrated. They have also none of those tufts of hair which are found on the leaves of the first sort: its native country is unknown.

Culture.—These plants are increased by seed, and layers.

The seed should be sown as soon as it is procured from abroad, in spring, in a bed of light earth, half an inch deep, when the plants will rise some the same year and others not till the spring following, moderate waterings being occasionally given, keeping them clean from weeds all summer, and protecting them from severe frost the first two winters. When two years old, plant them out in spring, in nursery rows, two feet asunder, to remain three or four years, or till wanted for planting out in the shrubbery, or other places.

Some sow the seeds in pots, or boxes, in order to move them to different situations as the season requires; and that when the plants do not come up the same year, the pots may be plunged in a hot-bed in the following spring to forward their rising.

The layers should be made from the young shoots of the preceding summer, by slit-laying, when most of them will be rooted by the following autumn, though in a dry poor soil they are sometimes two years before they are sufficiently rooted for being removed to plant out.

These trees have great merit for ornamenting shrubbery plantations, in assemblage with others of similar growths, being handsome, straight-growing trees, with fine heads, as well as adapted for planting, detached as single objects, in spacious short grass openings, in which they appear very ornamental, perfuming the air all round in summer.

They succeed in any common soil and situation, and endure the severest cold without injury. They are usually kept in the nurseries for sale.

LIQUORICE. See GLYCYRRHIZA.

LIRIODENDRUM, a genus containing a plant of the hardy deciduous ornamental tree kind.

It belongs to the class and order *Polyandria Polygynia*, and ranks in the natural order of *Coadunatæ*.

The characters are: that the calyx is a proper two-leaved involucre: the leaflets triangular, flat, deciduous: perianthium three-leaved: leaflets oblong, concave, spreading, petal-form, deciduous: the corolla six-petalled, bell-shaped: petals spatulate, obtuse, channelled at the base; the three exterior deciduous: the stamina have numerous filaments, shorter than the corolla, linear, inserted into the receptacle of the fructification: anthers linear, growing longitudinally to the sides of the filament: the pistillum has numerous germs, disposed into a cone: style none: stigma to each globose: there is no pericarpium: seeds imbricated into a body resembling a strobile: the seeds numerous, ending in a lanceolate scale, emitting an acute angle towards the base of the scale from the inner side, compressed at the base, acute.

The species cultivated is: *L. tulipifera*, Common Tulip-Tree.

It has the young shoots covered with a smooth purplish bark; they are garnished with large leaves, whose foot-stalks are four inches long; they are ranged alternate; the leaves are of a singular form, being divided into three lobes; the middle lobe is blunt and hollowed at the point, appearing as if it had been cut with scissars: the two side lobes are rounded, and end in blunt points: the leaves are from four to five inches broad near their base, and about four inches long from the foot-stalk to the point, having a strong midrib, which is formed by the prolongation of the foot-stalk: from the midrib run many transverse veins to the borders, which ramify into several smaller: the upper surface of the leaves is smooth, and of a lucid green, the under is of a pale green: the flowers are produced at the end of the branches; they are composed of six petals, three without, and three within, which form a sort of bell-shaped flower, whence the name: these petals are marked with green, yellow, and red spots, making a fine appearance when the trees are well charged with flowers: the time of flowering is in July; and when the flowers drop, the germ swells, and forms a kind of cone, which does not ripen in this climate. It is a native of North America.

It grows so large as to be a tree of the first magnitude in its native situation, and is generally known by the title of poplar: of late

there have been great numbers raised from seeds here, so that they are become common in the nurseries; and there are many of the trees in different parts which annually produce flowers.

Culture.—This plant may be increased by sowing the seeds, imported annually from America by the seed-dealers, in spring, either in the full ground, in beds of rich light earth, in a warm situation, placing the seed length-wise, and covering it nearly an inch deep, or in pots or boxes, plunging them in a gentle hot-bed: when the young plants appear they should be well screened from the sun, and have free air. They usually come up the same season; when in the former method water should be given them in dry weather; and if the bed be arched over with hoops, to have occasional shade from the mid-day sun in scorching weather, it will be beneficial to the germination of the seeds and growth of the young plants; continuing the waterings with care occasionally during the summer; and in winter, sheltering them with mats in frosty weather to preserve their tops, which are sometimes a little tender the first year, and apt to suffer.

When the plants are two years old, they should be set out in spring in nursery-rows, two feet distant, and a foot asunder in the rows; to remain a few years, till from three to six or eight feet high, when they may be planted where they are to remain.

They are raised best in the open ground, where the beds are prepared of good mellow rich earth, blended with old rotten cow-dung, sifting over the seeds fine turf-mould, mixed with fine sea- or pit-sand.

These trees succeed best afterwards in a light soil, not too dry. They should have their roots and branches as little pruned as possible.

They are highly ornamental in large plantations, among others of similar growth, and have a fine effect when planted out singly in large openings, kept in short grass, in pleasure-grounds.

LOBELIA, a genus containing plants of the herbaceous and under shrubby perennial kind.

It belongs to the class and order *Syngenesia Monogamia*, and ranks in the natural order of *Campanaceæ*.

The characters are: that the calyx is a one-leafed perianthium, five-cleft, very small: growing round the germ, withering: toothlets nearly equal: the two superior ones looking more upward: the corolla one-petalled, irregular: tube cylindric, longer than the calyx, divided longitudinally above: border five-parted, divisions lanceolate; of which the two superior ones are smaller, less reflex, more deeply divided, constituting an upper lip: the three inferior ones more spreading, frequently larger: the stamina have five awl-shaped filaments, the length of the tube of the petal, connate above: anthers connate into an oblong cylinder, gaping five ways at the base: the pistillum is a sharp-pointed, inferior germ: style cylindric, length of the stamens: stigma obtuse, hispid: the pericarpium an ovate capsule, two- or three-celled, two- or three-valved, gaping at the top, girt by the calyx: dissepiments contrary to the valves: the seeds a great many, very small: receptacle conic.

The species cultivated are: 1. *L. cardinalis*, Scarlet Lobelia, or Cardinal's Flower; 2. *L. siphilitica*, Blue Lobelia, or Cardinal Flower; 3. *L. longiflora*, Long-flowered Lobelia; 4. *L. pinifolia*, Pine-leaved Lobelia; 5. *L. inflata*, Bladder-podded Lobelia.

In the first, the root is composed of many white fleshy fibres: the lower leaves are oblong, and of a dark purplish colour on their upper side: the stalks are erect, about a foot and half high, with leaves about three inches long, and an inch and half broad in the middle, on very short petioles and placed alternately: the stalk is terminated by a spike (raceme) of flowers, of an exceeding beautiful scarlet colour; they have a pretty long tube, which is a little incurved, and at the top they are cut longitudinally into five segments; the two upper, which are the smallest, are greatly reflexed; the three under, which form the lower lip, are longer, and spread open. They appear at the end of July and in August, when they make a fine appearance for a month or more, and when the autumn proves favourable produce good seeds. It grows naturally in North America.

The second species has a perennial root: the stem simple, from a foot to two feet in height, and upwards, strong, simple, smooth, with angles formed by the decurrent edges of the leaves having stiffish hairs on them: the leaves are alternate, sessile, somewhat rugged: the flowers axillary, solitary, numerous, large, on short peduncles, forming altogether a long spike of a pale blue colour. It is a native of Virginia, flowering from August to October.

The third is an annual herbaceous elegant plant, seldom above fourteen or sixteen inches in height; the whole of it rough-haired: the stem almost upright, very much branched from all the axils: the leaves are alternate, sessile, subpinnatifid-toothed, sharpish, smooth, half a foot long: the peduncles one-flowered, axillary, solitary, villose. The whole plant is poisonous. It is a native of Jamaica, flowering from June to August.

The fourth species is a shrubby, upright, branched plant, the branches surrounded with

Painted by Syd. Edwards London Published Apr. 1.1806 by G. Kearsley Fleet Street Engraved by F. Sansom

1 *Lobelia Cardinalis.*
Scarlet Lobelia or Cardinals flower.

2 *Lilium Candidum.*
White Lily.

abundance of narrow sharp leaves an inch in length: the flowers many, small, blue, at the tops of the twigs, among the leaves. It is a native of the Cape of Good Hope.

The fifth is a biennial plant in this climate: the stems channelled, hairy, two feet high: the leaves about two inches long, and one broad in the middle, sessile, light green: flowers small, on long, slender, axillary peduncles, forming a loose spike: the corolla light blue. It flowers in July, and is a native of Virginia, &c.

Culture.—The two first kinds may be increased by seed, cuttings of their stalks, and parting the roots.

The seeds should be sown in autumn, or early in spring, in a warm border, or in pots or boxes, so as to be moved to different situations in different seasons, to have shelter from frost, and shade from the mid-day sun in summer. Those sown in autumn generally come up more freely the following spring than those which are sown in that season. They should have shelter in hard frosts, either under a frame, or awning of mats, but be fully exposed in mild weather, giving occasional waterings in the spring and summer. When the plants have attained two or three inches growth, they should be pricked out in separate small pots of rich earth, giving water, and placing them in the shade till fresh rooted, repeating the waterings occasionally in hot dry weather, and shifting them into larger pots as they may require; in winter moving them into a frame to have occasional shelter from inclement weather; and in the spring following some of them may be turned out into the full ground about March, when they will flower the ensuing summer. Some should also be retained in pots to be moved under shelter in winter, as a reserve in case those in the open air should be killed by frost.

As these plants generally flower in the greatest perfection the first and second year of their blowing, it is proper to raise a supply of new plants every year or two, in order to have them flower in the utmost perfection every year.

The cuttings of the young stalks should be divided into lengths of five or six inches, and be planted in an easterly border, two parts deep, being covered down with hand-glasses, and watered occasionally. They mostly emit roots, and form young plants in a month or six weeks; when the glasses should be taken away, and the plants managed as the others.

These hardy sorts sometimes afford off-sets from their sides at bottom, which may be separated in autumn, and potted for young plants, being managed as the seedlings.

The last three sorts may also be raised by seeds procured from abroad, which should be sown in pots of light sandy earth in the autumn, and plunged in the bark-bed; and when the plants are three inches high, planted in separate pots, being replunged in the bark-bed, giving water and occasional shade till they are fresh rooted. They must remain constantly in the hot-house, and have frequent moderate waterings given them.

The first two sorts have a fine appearance in the borders and clumps of pleasure-grounds, where they will succeed when protected in winter from frosts.

And the tender sorts afford a fine variety in hot-house collections.

LOBLOLLY BAY. See GORDONIA.

LOCUST-TREE. See CERATONIA.

LOGWOOD. See HÆMATOXYLUM.

LONDON-PRIDE. See SAXIFRAGA.

LONICERA, a genus containing plants of the deciduous flowering shrubby and evergreen kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Aggregatæ*.

The characters are: that the calyx is a five-parted, superior perianthium, small: the corolla one-petalled, tubular: tube oblong, gibbous: border five-parted: divisions revolute, one of which is more deeply separated: the stamina have five awl-shaped filaments, nearly the length of the corolla: anthers oblong: the pistillum is a roundish, inferior germ: style filiform, the length of the corolla: stigma obtuse-headed: the pericarpium is an umbilicated, two-celled berry: the seeds roundish, and compressed.

The species are: 1. *L. nigra*, Black-berried Upright Honeysuckle; 2. *L. Tatarica*, Tartarian Upright Honeysuckle; 3. *L. Xylosteum*, Fly Honeysuckle; 4. *L. Pyrenaica*, Pyrenean Upright Honeysuckle; 5. *L. alpigena*, Red-berried Upright Honeysuckle; 6. *L. cærulea*, Blue-berried Upright Honeysuckle; 7. *L. symphoricarpos*, Shrubby St. Peter's-wort; 8. *L. diervilla*, Yellow-flowered Upright Honeysuckle; 9. *L. periclymenum*, Common Honeysuckle; 10. *L. caprifolium*, Italian Honeysuckle; 11. *L. sempervirens*, Trumpet Honeysuckle; 12. *L. grata*, Evergreen Honeysuckle.

The first is three or four feet in height: the leaves are small, the younger ones hirsute, quite entire, but plaited a little, so as to appear serrate: stipules ovate-lanceolate: bractes two dry scales and three transverse broad leaflets: the peduncles are axillary, slender, an inch long, opposite: the calyx broadish: the corolla purple on the outside, white within, or quite white, pubescent: the berries black, a little oblong, containing three, five, and sometimes ten seeds. It is a native of

France, &c. flowering in March, April, and May.

The second species grows about the same height with the first and sixth sorts, and bears a great resemblance to them in the branches; but the leaves are heart-shaped, and the berries are red, growing sometimes single, at others double, and frequently there are three joined together; they are about the same size with the first sort. It is a native of Russia, flowering in May and June.

It varies with white flowers in shady groves.

The third rises with a strong woody stalk, six or eight feet high, covered with a whitish bark, dividing into many branches: the leaves are ovate, opposite, entire, and covered with a short hairy down, soft, like cloth to the touch: the flowers come out on each side of the branches opposite, on slender peduncles, each sustaining two white flowers standing erect: the three lower segments of the corolla are narrow and reflex, the other two are broader and upright. It is a native of the North of Europe, flowering in May.

The fourth species seldom rises more than three or four feet high, dividing into several spreading irregular branches: the leaves are smooth: the flowers come out from the side of these on slender peduncles, each sustaining two white flowers, which are cut into five segments almost to the bottom. It is a native of the Pyrenean Mountains, flowering in April.

The fifth has a short thick woody stem, which divides into many strong woody branches growing erect: the leaves are petioled, entire, dark green above, but pale underneath: the flowers upon very long slender peduncles, which come out opposite on each side of the branches, at the base of the leaves; they are red on the outside, but pale within, shaped like those of the third sort, but a little larger, and standing erect. They appear at the end of April, and are commonly succeeded by two ovate red berries, joined at the base, and having two punctures. It is a native of the South of Europe.

The sixth species seldom rises more than four or five feet high: the branches are slender, covered with a smooth purplish bark: the joints are distant, where leaves come out opposite, and sometimes there are two on each side: the peduncles are very short, each sustaining two white flowers, succeeded by blue berries single and distinct. The flowers appear in May (March or April), and the berries ripen in August. It is a native of Switzerland.

The seventh is about four feet in height, sending out many slender branches: the leaves ovate, hairy, opposite, on very short petioles: the flowers are produced in whorls round the stalk; they are of an herbaceous colour, and appear in August: the fruit, which is hollow, and shaped like a pottage pot, ripens in the winter: the corollas are regular and bell-shaped: the fruit fleshy, globular, the form and size of the flowers of Arbutus, four-celled, containing cartilaginous roundish seeds. It is a native of Virginia, &c. flowering in August and September.

The eighth species is a low shrub, seldom rising more than three feet high: the stalks are slender and woody, and have a reddish-coloured bark: the leaves oblong, pointed, slightly serrate, opposite: the flowers small, pale yellow, two or three on each division of the raceme: the berries oval, black, four-celled, with one hard seed in each cell: the roots creep far under ground, and send out many stems: many of these which come up in the spring produce flowers the same year, so that there is generally a succession of them from May to September; the shoots of the former year flowering early, the side branches soon following, and then the young shoots. It is a native of North America.

The ninth trails over bushes, and twines round the boughs of trees, with its very slender hairy (or smooth) branches, which are opposite, and commonly stained with purple, in part at least, or on one side: the leaves opposite, ovate, smooth (or hairy), underneath glaucous, all distinct and more separated from the stem, though even in these there is a slight membranaceous ring running round the branch, and connecting the two opposite leaves: the upper floral leaves are sessile and cordate: the peduncles short, single, or more often triple, covered with glandular hairs, as are also the calyx, and tube of the corolla: the flowers are in a thick roundish whorled spike, many together (from ten or twelve to nineteen or twenty); the tube an inch long, curved a little; the border two-parted, both parts reflex; the upper one divided into four blunt and nearly equal segments, the lower one linear and entire: the tube is wider and shorter, the border much longer than in the tenth sort: the border being turned back, the stamens stand much above the corolla, and the pistil much above them: the corollas are usually red on the outside, and yellowish within, but they vary much in colour, between red, purple, and yellow, and in the shade are very pale: they smell very sweet, especially in the evening. It is a native of most parts of Europe, flowering here from the end of May to July.

The great beauty and exquisite fragrance of the flowers of this plant give it a place in most ornamental plantations. In climbing it turns from east to west, with most of our climbers; and in common with them it bears clipping and

pruning well; for, in a state of nature, those plants that cannot ascend without the assistance of others are often liable to lose large branches; they have therefore a proportional vigour of growth to restore accidental damages. It is subject, when placed near buildings, to be disfigured and injured by *Aphides*, vulgarly termed *Blights:* these insects are not very numerous in spring, but as the summer advances they increase in a surprising degree; their first attacks should of course be watched, and the branches they first appear on be cut off and destroyed, for when they have once gained ground they are defended by their numbers. Small plants may be cleared of them by tobacco dust or Spanish snuff, but this is not practicable for large trees: the leaves are likewise liable to be curled up by a small caterpillar, which produces a beautiful little moth, *Phalæna Tortrix*. In the evening some species of Sphinges or Hawk-Moths are also frequently seen to hover over the blossoms, and with their long tongues to extract the honey from the very bottom of the flowers.

There are several varieties; as the Late Red, which produces a greater quantity of flowers together than either the Italian or Dutch sorts, making a finer appearance than either of them during the time of flowering; but it has not been so long cultivated as the latter.

It was formerly termed Flemish Honeysuckle. There are also sometimes varieties with striped leaves.

The Dutch variety may be trained with stems, and formed into heads, which the wild sort cannot, the branches being too weak and trailing for the purpose: the branches of this are smooth, of a purplish colour, garnished with oblong oval leaves, three inches long, and an inch and three quarters broad, of a lucid green on their upper side, but pale on their under, having very short foot-stalks; they are placed by pairs, but are not joined at their base: the flowers are produced in bunches at the end of the branches, each flower arising out of a scaly cover, which, after the flowers fade, forms an oval head, whose scales lie over each other like those of fish: the flowers are of a reddish colour on their outside, and yellowish within, of a very agreeable odour. It flowers in June, July, and August.

There are two sub-varieties of it, the Long Blowing and the Late Red.

The stems are stronger, the leaves, flowers, and heads of berries larger, and the corollas redder than in the Woodbine sort.

The Oak-leaved variety has sinuate leaves, cut like the oak, and smooth.

There is likewise a variety with variegated leaves.

In the tenth species the branches are slender, covered with a light green bark, and garnished with oval leaves of a thin texture, placed by pairs, sitting close to the branches; but those which are situated towards the end of the branches join at their base, so that the stalk seems as if it came through the leaves: the flowers are produced in whorled bunches at the ends of the branches; are white, and have a very fragrant odour, but of short duration, so that in about a fortnight they are entirely over; and soon after the leaves appear as if blighted and sickly, making an indifferent appearance the whole summer, which has rendered them less valued than the others. It flowers in May, and is a native of the South of Europe.

The variety which is the next in succession to the white, is the yellow, in which the shoots are much like those of the former, but have a darker bark: the leaves are also of a deeper green; the flowers of a yellowish red, and appear soon after the white; they are not of much longer duration, and are succeeded by red berries, containing one hard seed inclosed in a soft pulp, which ripens in the autumn.

Besides this, some mention other varieties, as the early red-flowering, the late red-flowering, and the evergreen red-flowering.

The eleventh grows naturally in Virginia, and many other parts of North America, but has been long cultivated in gardens by the title of Virginia Trumpet Honeysuckle. Martyn remarks, that of this there are two varieties, if not distinct species, one being much hardier than the other. The old sort, which came from Virginia, has stronger shoots; the leaves are of a brighter green; the bunches of flowers larger, and deeper coloured than in the other which came from Carolina. These plants have the appearance of the ninth sort, but the shoots are weaker than any of those, except the wild sort called Woodbine; they are of a purplish red colour, and smooth: the leaves are of an oblong oval shape inverted, and closely surrounding the stalk; of a lucid green on their upper side, but pale on their under: the flowers are produced in bunches at the end of the branches; these have long slender tubes, which are enlarged at the top, where they are cut into five almost equal segments: the outside of the flower is of a bright scarlet, and the inside yellow; they have a great appearance of the Honeysuckle, but are not so deeply divided, nor are the segments reflexed. They have no odour, but are cultivated for the beauty and long continuance of their flowers,

and their evergreen leaves. It flowers from May to August.

The twelfth species has strong branches, covered with a purple bark, which are garnished with lucid green leaves embracing the stalks, and continuing their verdure all the year: the flowers are produced in whorled bunches at the ends of the branches; there are frequently two and sometimes three of these bunches rising one out of another; they are of a bright red on their outside, and yellow within, of a strong aromatic flavour. This sort begins to flower in June, and there is a succession of flowers till the frost puts a stop to them, so that it is the most valuable of all sorts. It is a native of North America.

Culture.—All the sorts may be increased either by layers or cuttings, but the latter is the better practice. The layers should be made from the young shoots, and be laid down in the autumn or early spring, the straggling tops being removed, when by the following autumn they will have taken root, and should be cut off from the plants, being either planted where they are to remain, or into a nursery to be trained for standards, by fixing down stakes to the stem of each plant, to which the principal stalk should be fastened, all the others being cut off; training it to the intended height, when it should be shortened to force out lateral branches, and these be again stopped to prevent their growing too long. By constantly repeating this as the shoots are produced, they may be formed into a sort of standard; but if regard is had to their flowering, they cannot be formed into regular heads, as the constant shortening will destroy the flower-buds.

The cuttings should be taken from the strong shoots of the former summer, with three or four joints, and be planted in rows in a shady border, to the depth of two or three of them, a foot apart, and six inches from plant to plant. When they have taken good root in the autumn or spring following, they may be removed into the nursery, and be planted out in rows two feet distant, and a foot asunder in them, where they may be kept a year or two, till wanted for planting out where they are to remain.

The eighth sort may be raised from suckers, which it affords in plenty, by taking them off and planting them as above in the autumn in a rather moist soil.

Several of the sorts may likewise be increased by sowing the seed or berry in a bed of light mould in the autumn, to the depth of an inch. The plants rise in the first or second spring; and afterwards require the same management as the others.

The only culture which any of the sorts afterwards require is, in the upright sorts, to have their straggling shoots shortened, and the dead wood cut out; and those trained as climbers, to have their branches conducted in a proper manner upon their respective supports; and every year all rambling shoots reduced and trained as may be proper, so as to preserve them within due limits and order, except designed to run wild in their own rural way, especially those intended to climb among the branches of trees, shrubs, and bushes; those also intended to cover arbours and seats should be pruned and trained annually, laying the shoots along at their length, till they have covered the allotted space; shortening or clearing out all such stragglers as cannot be properly trained: also such of those sorts as are trained against walls, &c. must have an annual pruning and training, by going over them two or three times in summer, laying in some of the most convenient proper shoots, some at their length, shortening or retrenching others as necessary to preserve regularity, and the proper succession of flowers; being careful to train enough, at this time, of such as appear necessary to continue the bloom as long as possible; and in winter-pruning, all those left in summer, which may appear superfluous or unnecessary, should be turned out, shortening all such as are too long for the space allotted for them, especially all those with weak straggling tops, nailing in the remaining proper branches and shoots close to the wall, or other support.

They are all proper for plantations, both from the variety of their different growths, and the ornament and fragrance of their flowers; though the flowers of the upright kinds are not so showy as those of the trailers; but they exhibit an exceedingly agreeable variety.

The trailing species have, however, the greatest merit, not only in their numbers, but size, elegance, and odour, as well as in duration. The shrubs of all the sorts are, notwithstanding, proper to be introduced in shrubberies, the upright kinds to intermix as standards. The trailing kinds, whose branches are great ramblers, and, without support, trail along the ground, should generally be introduced as climbers, having stout stakes placed to each for them to climb upon, which they effect by ascending spirally round the support, to a considerable height; and also be placed to ascend round the stems of trees, and to climb among the boughs of the adjacent bushes, shrubs, and hedges, which they effect in a very agreeable manner, by interweaving their branches with them.

The climbers are likewise proper for training

against walls and arbours, &c., for the ornament and fragrance of their flowers, laying their branches in four or five inches asunder; thinning out the superabundant shoots annually, and training in some of the most robust for succession wood, either at full length, or shortened as most proper to fill the space.

The evergreen kinds are principally of the climbing tribe, and have much effect in their evergreen foliage and the elegance of their flowers, as well as in their long continuance in blow.

LOOKING-GLASS PLANT. See HERITIERA.

LOOSE-STRIFE. See ANAGALLIS.

LOPPING TREES, the practice of cutting off the boughs or branches of pollard or other trees. This work should be done with great care and attention, so as to prevent the decay of the trees.

Lopping of trees, at ten or twelve years growth, is said to preserve them much longer, and occasion the shoots to grow more into wood in one year than they do in old tops in two or three. When great boughs are ill taken off, it often spoils the trees; they should therefore always be spared, unless there is an absolute necessity. When they must be cut off, it should be close and smooth, and not parallel to the horizon, covering the wound with loam and horse-dung mixed, or some of Mr. Forsyth's composition, to prevent the wet from entering the bodies of the trees and destroying them.

There are various signs of the decay of trees; as, the withering or dying of their top branches; the wet entering at a knot; their being hollow, or discoloured; their making but poor shoots, and woodpeckers making holes in them.

Nothing is more injurious to the growth of timber-trees, than that of lopping or cutting off the great branches from them; as they grow better without it, and do not decay so soon.

The dead branches should however be removed.

The proper seasons for this sort of business, are the very early autumn and spring months.

All sorts of resinous trees, or such as abound with a milky juice, should be lopped very sparingly, as they are subject to decay when often lopped. The best season for lopping these trees is the latter end of summer or beginning of autumn; they then seldom bleed much, and the wounds are commonly healed over before the cold weather sets in.

Few sorts of ornamental trees should be much lopped, as it greatly injures their beauty and appearance. The only thing necessary, is to take off such straggling branches as may grow in an awkward or improper direction. See PRUNING OF TREES.

This sort of work is mostly performed with a saw, hedging-bill, or ax.

LORANTHUS, a genus containing a plant of the exotic kind for the stove.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Aggregatæ*.

The characters are: that the calyx has the perianthium of the fruit inferior: margin entire, concave; of the flower superior, or the margin entire, concave: the corolla has six, oblong petals, revolute, equal: the stamina have six awl-shaped filaments, fastened to the bases of the petals, the length of the corolla: anthers oblong: the pistillum is an oblong germ, between the two calyxes, or inferior: style simple, the length of the stamens: stigma blunt: the pericarpium is an oblong berry, one-celled: the seed oblong.

The species cultivated is *L. Americanus*, American Loranthus.

Its branches are subdivided, leafy, smooth, pale green, brittle: the leaves petioled, opposite, entire, subcoriaceous, nerved, and pale: the petioles short, compressed, smooth: the racemes subdivided, terminating, with three-cornered branchlets; the last pedicels trifid, one-flowered: the flowers red.

It ramps over the highest trees in Jamaica, &c., especially the *Coccoloba grandifolia*, with the root adhering firmly to the bark like Mistletoe.

Culture.—This plant may be increased by sowing the seeds as soon as they are fully ripened, in pots of light rich earth, being kept in a mild hot-bed until the beginning of the autumn, when they must be plunged in the bark hot-bed of the stove, being afterwards treated as other tender plants of the same kind.

It affords variety in stove collections.

LORDS-AND-LADIES. See ARUM.

LOTE-TREE. See CELTIS.

LOTUS, a genus containing plants of the herbaceous and under-shrubby kind.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a simple umbel: perianthium one-leafed, tubular, half-five-cleft: teeth acute, equal, erect, permanent: the corolla papilionaceous: banner roundish, bent down: claw oblong, concave: wings roundish, shorter than the banner, broad, converging upwards: keel gibbous below, closed above, acuminate, ascending, short: the stamina have diadelphous filaments, simple and nine-cleft, ascending, with broadish tips: anthers small, simple: the

pistillum is a columnar germ, oblong: style simple, ascending: stigma an inflected point: the pericarpium is a legume cylindric, stiff and straight, stuffed, longer than the calyx, many-celled, two-valved: the seeds several and cylindric.

The species cultivated are: 1. *L. tetragonolobos*, Winged Bird's-foot Trefoil; 2. *L. jacobæus*, Dark-flowered Bird's-foot Trefoil; 3. *L. creticus*, Silvery Bird's-foot Trefoil; 4. *L. hirsutus*, Hairy Bird's-foot Trefoil; 5. *L. Dorycnium*, Shrubby Bird's-foot Trefoil.

The first has an annual root: the stems several, decumbent, upright, about a foot long, having at each joint a ternate leaf: the leaflets ovate: the stipules of the same shape: peduncles axillary, alternate, from two to three inches long, each sustaining one (sometimes two) large red flowers at the top, with three leaves just under the flower. The wings are very dark purple, appearing to be black at the end: the legume thick, with four broad undulating wings: the seeds sub-globular, the size of a small pea, smooth, pale or livid purple, without spots. It flowers in June and July, and the seeds ripen in autumn. It is a native of Sicily.

It was formerly cultivated as an esculent plant, for the green pods, which are said to be still eaten in some of our northern counties, but they are very coarse. It is now chiefly cultivated in flower-gardens for ornament.

The second species has a slender woody stem, from two to three feet high, sending out many slender herbaceous branches: the leaves sessile, hoary: leaflets narrow, white: the flowers axillary from the upper part of the stem, four or five, on very slender peduncles, of a yellowish deep purple colour: the pods taper, slender, little more than an inch long, containing five or six small roundish seeds. It is a native of the Cape Verd Islands, flowering all the summer and autumn, and many times a great part of the winter.

The third species rises with slender stems which require support, from three to four feet high, sending out a few side branches. At each joint is a neat silvery ternate leaf, with two appendages or stipules: the peduncles axillary, from two to three inches long, sustaining heads of yellow flowers, which part in the middle, each head containing four or six flowers: these appear in May, June, and July, and are succeeded by long taper pods filled with roundish seeds, which ripen in the autumn. It is a native of Spain and the Levant.

The fourth species has a perennial stalk three feet high: when the roots are large, they frequently send up several of these stalks, especially if the old ones be cut down: they are hairy, and divide into several branches: the leaves are ternate, hoary, with two stipules: the flowers in heads on long axillary peduncles: the calyxes very hairy: the corollas dirty white, with a few marks of pale red: the pods short, thick, chestnut-coloured, containing several roundish seeds. It is a native of the South of Europe, flowering from June to August.

The fifth species rises with weak shrubby stalks three or four feet high, sending out many slender branches, thinly set with small hoary leaves, having five leaflets, spreading like the fingers, and sessile: the flowers at the extremity of the branches in small heads. They are very small and white, appear at the end of June, or in July, continue to September, and are succeeded by short pods, containing two or three small round seeds. It is a native of the South of Europe.

Culture.—The first sort is raised by sowing the seed annually in spring, in the open ground, in the places where the plants are to remain, in patches in different parts, of five or six seeds in each, half an inch deep. The plants soon come up, which, remaining in the same place for flowering, require only occasional weeding, being either suffered to trail, according to their natural growth, or tied up to sticks.

The other sorts may be increased by seeds and cuttings.

The seeds should be sown in pots of light earth or in a moderate hot-bed; and when the plants are about three inches high be planted out in separate small pots of light rich earth, giving water, and placing them in the shade till fresh-rooted.

The cuttings of the young stalks and branches may be planted any time in the spring or summer, in beds or pots of rich mould, giving shade and water. They emit roots, and form plants in a few weeks, but may be greatly facilitated by covering them close with hand-glasses till they begin to shoot at top; then they should be gradually inured to the air, and soon after be transplanted into separate pots.

The young green seed-pods of the first sort were formerly dressed and eaten as peas, or in the manner of kidney-beans.

The other kinds effect an agreeable variety in collections of green-house plants, both in their foliage and flowers. They all require shelter from frost, the two first in particular; the two last are somewhat hardier, and sometimes succeed in the full ground all the year, in warm dry situations. A few plants should however con-

stantly be kept in the pots, to be protected in the winter season.

LOVAGE. See LIGUSTICUM.

LOVE-APPLE. See SOLANUM LYCOPERSICUM.

LOVE-LIES-BLEEDING. See AMARANTHUS CORDATUS.

LUNARIA, a genus containing plants of the herbaceous annual and perennial kinds.

It belongs to the class and order *Tetradynamia Siliculosa*, and ranks in the natural order of *Siliquosæ* or *Cruciformes*.

The characters are: that the calyx is a four-leaved perianthium, oblong: leaflets ovate-oblong, blunt, converging, deciduous, of which the two alternate ones are gibbous and bagged at the base: the corolla four-petalled, cruciform: the petals entire, blunt, large, the length of the calyx, ending in claws of the same length: the stamina have six awl-shaped filaments; four the length of the calyx, two a little shorter: anthers from upright, spreading: the pistillum is a pedicelled germ, ovate-oblong: style short: stigma blunt, entire: the pericarpium is an elliptic silicle, flat, entire, upright, very large, pedicelled, terminated by the style, two-celled, two-valved: partition parallel and equal to the valves, flat: the seeds some kidney-shaped, compressed, marginal, in the middle of the silicle: the receptacles filiform, long, inserted into the lateral sutures.

The species cultivated are: 1. *L. rediviva*, Perennial Honesty; 2. *L. annua*, Annual Honesty, Moor-wort, or Satin-flower; 3. *L. Ægyptiaca*, Egyptian Honesty.

The first is a very large plant: the root is perennial, white: stem from three to four feet high, upright, simple, channelled, green tinged with purple, hirsute: the lower leaves opposite; upper alternate, on long petioles, smooth or rough-haired, cordate, unequally serrate, nerved, acuminate, near a span long, and three or four inches wide: the flowers terminating, on long slender peduncles, often bifid and trifid, of a white purple colour, and odorous. They have two glands on each side between the longer stamens and the style, and one between the style and each shorter stamen, which accounts for the bagging of the perianthium. It is a native of the South of France, &c.

The second species has a biennial, knobbed root: the stem smaller than the first; upright, branched, hirsute, round, half a yard high: the leaves are rough-haired, the floral ones almost always opposite, sessile: stem-leaves petioled, much smaller than those of the first sort, cordate, dull green, and serrate: the flowers are of a purplish violet or blue-purple colour, and inodorous. It is a native of Germany. Both these species flower in May and June.

The seed-vessels, when fully ripe, become transparent, and of a clear shining white like satin; whence the name of Satin-flower.

The third is an annual plant, with a smooth branching stalk little more than a foot high: the leaves are unequally pinnate: leaflets differing in size and form; some almost entire, others cut at their extremities into three parts; they are smooth, and of a lucid green: the flowers stand each upon pretty long slender peduncles, which come out from the side, and also at the end of the branches, in loose small clusters; they are of a purple colour, and are succeeded by oblong compressed pods, which hang downward, and when ripe are of a feuille-mort colour. It is a native of Egypt, flowering here, in June and July.

Culture.—These plants may be raised by sowing the seed in a shady border, or, which is better, in patches in the situations where they are to remain, in the autumn, keeping the plants afterwards properly thinned out and free from weeds. They may likewise be sown in the early spring; but the former is the better season, as the plants rise stronger. The last sort should have an open situation. When sown in beds, the perennial sort should be set out where they are to remain, in the following autumn after being sown.

They all afford ornament and variety in the borders and clumps of pleasure-grounds, in which the first sort should be placed more backward.

LUPINUS, a genus containing plants of the hardy herbaceous annual and perennial flowery kinds.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leafed perianthium, bifid: the corolla papilionaceous: banner cordate-roundish, emarginate, bent back at the sides, compressed: wing subovate, almost the length of the banner, not fastened to the keel, converging below: keel two-parted at the base, sickle-shaped upwards, acuminate, entire, the length of the wings, narrower: the stamina have ten filaments, united, somewhat ascending, distinct above: anthers five, roundish, and as many oblong: the pistillum is an awl-shaped germ, compressed, villose: style awl-shaped, ascending: stigma terminating, blunt: the pericarpium is a large legume, oblong, coriaceous, compressed, acuminate, one-celled: the seeds several, roundish and compressed.

The species cultivated are: 1. *L. albus*, White Lupine: 2. *L. varius*, Small Blue Lupine; 3. *L. angustifolius*, Narrow-leaved Blue Lupine: 4. *L. hirsutus*, Great Blue Lupine; 5. *L. luteus*, Yellow Lupine; 6. *L. perennis*, Perennial Lupine.

The first has a thick upright stalk about two feet high, dividing towards the top into several smaller hairy branches: the leaves are digitate, composed of seven or eight narrow oblong leaflets, joining at the base; they are hairy, of a dark grayish colour, and have a silvery down: the flowers are produced in loose spikes at the end of the branches; they are white and sessile: the legumes are straight, hairy, about three inches long, containing five or six seeds, which are roundish, flatted like a lens, extremely smooth and even, perfectly white without any spots, smaller than most of the others. It flowers in July, and the seeds ripen in the autumn: growing naturally in the Levant.

The second species is an annual plant, with a firm, straight, channelled stalk near three feet high, divided towards the top into several branches: the leaves are digitate, composed of five, six, or seven oblong or linear leaflets, which join at their base, and are hairy: the flowers are produced in spikes at the end of the branches, standing round the stalk in half whorls; they are of a light blue colour. It is a native of the South of France, &c. flowering in July.

The third has much the appearance of the second sort, but the stalks rise higher: the leaves have more leaflets, and stand upon longer foot-stalks: the leaflets are blunt: the seeds are variegated; and, according to Linnæus, they are linear, and the flowers blue. Ray describes it as more upright, and much taller, being eighteen inches high, and as tall as the first. It is a native of Spain, &c.

The fourth species is also an annual plant, which rises with a strong firm channelled stalk, from three to four feet high, covered with a soft brownish down, dividing upward into several strong branches, garnished with digitate leaves, composed of nine, ten, or eleven wedge-shaped hairy leaflets, which are narrow at their base, where they join the foot-stalk, but enlarge upward, and are rounded at the top, where they are broadest: the foot-stalks of the leaves are three or four inches long: the flowers are placed in whorls round the stalks above each other, forming a loose spike, which proceeds from the end of the branches; are large, and of a beautiful blue colour, but have no scent: they appear in July, and the seeds ripen in autumn: the pods are large, almost an inch broad, and three inches long; inclosing three large roundish seeds, compressed on their sides, very rough and of a purplish brown colour. It is a native of the South of Europe.

There is a variety with flesh-coloured flowers, commonly called *Rose Lupine*.

The fifth has a stem a foot high, branching: the leaves are digitate, composed of seven, eight, or nine narrow hairy leaflets, nearly two inches long: the flowers are yellow, odorous, in loose spikes at the end of the branches, composed of several (six or seven) whorls, with spaces between them, and about five flowers in each, terminated by three or four flowers, sitting close at the top; these are succeeded by ovate flattish hairy pods, about two inches long, standing erect, and inclosing three, four, or five roundish seeds, a little compressed, yellowish white, variegated with dark spots. It is a native of Sicily, flowering in June and July.

The sixth has a perennial creeping root, from which arise several erect channelled stalks a foot and a half high, sending out two or three small side branches, garnished with digitate leaves, composed of from five to ten or eleven narrow spear-shaped leaflets, which join at their base, and stand upon very long foot-stalks, having a few hairs on their edges: the flowers grow in long loose spikes, which terminate the stalks, and are placed without order on each side; they are of a pale blue colour, and on short peduncles; appearing in June, and the seeds ripening in August, which are soon scattered if they are not gathered when ripe; for, after a little moisture, the sun causes the pods to open with elasticity, and cast out the seeds to a distance. It is a native of Virginia.

Culture.—These plants may be readily raised by sowing the seeds in patches in the borders, with other annuals in the spring, where they are to remain; thinning them afterwards where they are too close, and keeping them clean from weeds. In order to have a succession of flowers, they should be sown at different times, as in April, May, and June. The seed of those only which are first sown ripens well.

In order to have good seed of the fourth kind, some seeds should be sown on a sunny border under a wall, or in pots placed under frames, the plants in the latter case being turned out and planted with balls of earth about them in the spring.

They are all useful plants for producing variety, in the borders, clumps, and other parts. The last sort should be sown at many different times.

LUXURIANT PLANTS, a term in gardening, signifying such as become greatly aug-

mented in growth beyond their common natural state, and which rarely acquire that degree of perfection which is the case with those of more moderate growths. This sometimes happens from excess of nourishment, and sometimes from the nature of the plants.

It is produced differently; sometimes prevailing in the whole plant, sometimes in particular parts, as in some of the shoots, and frequently in the flowers.

The first may be considered such as shoot much stronger than plants of the same species generally do, and happens both in herbaceous plants and trees, &c. which never attain perfection so soon as the more moderate growers: thus many sorts of esculent plants which shoot luxuriantly to leaves and stalks, &c. as cucumbers, melons, cabbages, cauliflowers, turnips, radishes, beans, peas, &c., never arrive so soon to perfection as those of moderate growth; and such plants as appear to be naturally of themselves of a very luxuriant nature, are very improper to stand, from which to save seed for future increase.

This is also the case in fruit-trees; as such as are very luxuriant shooters are much longer before they attain a bearing state than those of middling growth; and they never bear so plentifully, or have the fruit attain such perfection. This luxuriance is frequently acquired by unskilful pruning, especially in wall-trees, &c., as it is often the practice, when wall or espalier trees assume such a growth, to cut all the shoots short; by which, instead of reducing the tree to a moderate state of shooting, it has its vigour increased, as too considerable shortening of strong shoots promotes their throwing out still stronger, and producing more abundant or superfluous wood. Therefore, in pruning very luxuriant espalier and wall-fruit trees, they should be assisted somewhat in their own way, as it were, by training in plenty of shoots annually for a year or two, to divide the redundancy of sap; or in the summer and winter prunings, always leaving them rather thicker than in the common practice, and mostly at full length, unless it be necessary to shorten such as are of very considerable length, or in some particular part of the tree, to force out a supply of wood to fill a vacancy. Some sorts of fruit-trees should indeed never be generally shortened in the common course of pruning, except in casual very extended irregular growths, or occasionally for procuring a supply of wood as mentioned above. This is particularly necessary in apples, pears, plums, cherries, and fig-trees; for, if general shortening was to be practised in these sorts, they would continue shooting every year so luxuriantly to wood, that they would never form themselves into a proper bearing state: even in those trees where shortening is necessarily practised in winter, in most of the annual supplies of shoots, as in peaches, nectarines, &c., in cases of luxuriant growth, it should be very sparingly performed, the general shoots not being cut very short, and some of the most vigorous left almost or quite at the full length.

This is the proper method to reduce luxuriant trees to a moderate growth, and to a bearing state; as by training the shoots thicker, and leaving them longer, and continuing it for a year or two, the redundant sap having greater scope to divide itself, cannot break out with that luxuriance, as when it has not half the quantity of wood to supply with nourishment, as in the case of short pruning. See ESPALIER, WALL-TREES, and PRUNING.

This state seldom occurs with any continuance in standard-trees, where permitted to take their natural growth, except in casual straggling shoots, which should always be taken out.

Over luxuriant shoots are mostly met with in trees and shrubs; but require more particularly to be attended to in the culture of the fruit tree kind, especially those of the wall and espa lier sort, which undergo annual pruning.

They are such as shoot so vigorously in length and substance, as greatly to exceed the general growth of those usually produced on the same kind of plant or tree, and are sometimes general, but in other cases only happen to particular shoots in different parts of a tree, &c. They are discoverable by their extraordinary length and thickness, and by their vigour of growth, which always greatly impoverishes the other more moderate shoots in their neighbourhood, and likewise the fruit, &c., as well as often occasions a very irregular growth in the respective trees. Such shoots frequently occur in wall and espalier fruit-trees, and are the effects of injudicious pruning. When they are in general wholly so, they should be managed as directed above; but when only in particular shoots here and there in a fruit or other tree or shrub under training, such shoots being of such a very luxuriant nature as to draw away the nourishment, at the expense of the adjacent moderate shoots, and which, by their vigorous irregular growth, cannot be trained with any degree of regularity; they should for the most part, as soon as discoverable, in the summer or winter prunings, be cut out, taking them off as close as possible to the part of the branch whence they originate, that no eye may be left to shoot again; unless such a shoot should rise in any part of a tree or shrub, where a further

supply of wood may be requisite; in which case it may be retained, and shortened as convenient, to force out a supply of more shoots laterally to fill the vacancy.

When it prevails in other trees and shrubs than those of the fruit kind, they should have occasional attention, pruning them in regular order in their younger advancing growth, or afterwards occasionally in particular sorts, as may be necessary; observing, in either, when any straggling shoots, &c. assume a very luxuriant rambling growth, greatly exceeding the other general branches, that they be more or less reduced, or cut entirely away close to their origin, as may be most expedient, according to the nature of growth of the trees or shrubs, either in summer or winter, &c.

Most double flowers may be considered as luxuriant, especially such as have the cup or corolla multiplied, or so augmented in the number of their leaves, or flower-petals, inward, as to exclude some part of the fructification, as the same thing occurs in flowers as in esculent plants and fruit-trees, from their over luxuriant growth; for, as the flower is designed for perfecting the fruit and seed, when the petals are multiplied to the diminution of the stamina, &c. no impregnation ensues, and of course no fruit or seed is produced.

In the double varieties of most kinds of flowers produced on ornamental flowering plants, this luxuriance is generally considered as a superior degree of perfection; and has different modifications.

The highest degree of this sort of luxuriance is met with in carnations, anemones, ranunculuses, the poppy, lychnis, peony, narcissus, violet, and some others.

LYCHNIS, a genus containing plants of the hardy, herbaceous, flowery, perennial kind.

It belongs to the class and order *Decandria Pentagynia*, and ranks in the natural order of *Caryophyllei*.

The characters are: that the calyx is a one-leafed perianthium, oblong, membranaceous, five-toothed, permanent: the corolla has five petals: claws the length of the calyx, flat, margined: border often cloven, flat: the stamina have ten filaments, longer than the calyx, alternately shorter, each of these fixed to a claw of each petal: anthers incumbent: the pistillum is a subovate germ: styles five, awl-shaped, longer than the stamens: stigmas reflex against the sun, pubescent: the pericarpium is a capsule approaching to an ovate form, covered, one-, three-, or five-celled, five-valved: the seeds very many, and roundish.

The species cultivated are: 1. *L. chalcedonica*, Scarlet Lychnis; 2. *L. Flos cuculi*, Red-flowered Lychnis, Meadow Pink, or Ragged Robin; 3. *L. coronata*, Chinese Lychnis; 4. *L. viscaria*, Viscous Lichnis, or Catchfly; 5. *L. diurna*, Rose-flowered Lychnis, Wild Red Campion, or Red Bachelor's Buttons; 6. *L. vespertina*, White-flowered Lychnis, Wild White Campion, or White Bachelor's Buttons.

The first has a perennial root: the stems three feet high, upright, stiff, round, jointed, hairy: at every joint are two large leaves of a brownish green colour: the flowers terminating in a large flat-topped tuft, consisting of several bundles: the corolla is of a scarlet or bright red orange colour, varying to white, blush, and variable, that is, pale red, growing paler till it becomes almost white. It is a native of Russia, &c.

Besides its varying as above, there is a variety with very double flowers of a beautiful scarlet colour: it has a perennial root, from which arise two, three, or four stalks, according to the strength of the roots, which in rich moist land grow upwards of four feet high; the stalks are strong, erect, and hairy, being garnished the whole length with spear-shaped leaves sitting close to the stalks, placed opposite; and just above each pair of leaves there are four smaller leaves standing round the stalk: the flowers are produced in close clusters sitting upon the top of the stalk: when the roots are strong, the clusters of flowers are very large, and make a fine appearance, coming out the latter end of June, and in moderate seasons continue near a month in beauty. The stalks decay in autumn, and new ones arise in the spring following.

The second has also a perennial root, brownish white, subacrid: the stems from one to three feet high, upright, somewhat angular and grooved, swelled at the joints, purplish: they are procumbent, and become upright at the time of flowering: the stem-leaves opposite, connate, lanceolate, keeled, upright, smooth: the peduncles opposite, with one generally between them: the calyx ten-angled, of a deep purple colour: the corolla pink or purplish red, varying sometimes to white: the border of the petals dividing into four segments, of which the two outer are shorter and narrower: the claws have two small spear-shaped teeth at the top: the capsule one-celled, the mouth having five teeth which turn back: the seeds flattish, rugged, of a brown ash-colour. It is a native of most parts of Europe, flowering in May and June.

In the third the whole plant is smooth: the stem simple, round, upright, a foot high: the leaves opposite, embracing, oblong-ovate, acute, entire, an inch or a little more in length: the flowers aggregate, about three, sessile: the calyx is ten-angled: the petals are gashed, cre-

nate-multifid: the filaments the length of the tube of the corolla, filiform: the germ superior: styles five, much shorter than the tube of the corolla. It is a native of China and Japan, flowering in June and July.

The fourth species has long, narrow, grass-like leaves, which come out from the root without order, sitting close to the ground; between these come up straight single stalks, which in good ground rise a foot and half high; at each joint of the stalk come out two leaves opposite, of the same form as the lower, but decreasing in their size upwards; under each pair of leaves, for an inch in length, there sweats out of the stalk a glutinous liquor, which is almost as clammy as birdlime, so that ants and other insects which happen to light upon these places, or attempt to creep up to the flowers, are fastened to the stalk; whence the title of Catchfly: the root is perennial, yellowish on the outside, white within: the stem round, not grooved, smooth, being terminated by a cluster of purple flowers, and from the two upper joints come out on each side of the stalk a cluster of the same flowers, so that the whole forms a sort of loose spike: these appear in the beginning of May, and the single flowers are succeeded by roundish seed-vessels, which are full of small angular seeds, ripening in July. It is a native of most parts of Europe.

The fifth has likewise a perennial root, the thickness of the little finger, white, of a slightly acrid and bitter taste, furnished with numerous fibres: the stalks are several, upright, from one to three feet high, round, hirsute, jointed, purple, the joints swelled: the uppermost branches forked: the leaves opposite, connate, ovate-acuminate, hirsute, slightly nerved: the calyx is hairy, striated, purple, five-toothed; in the female more turgid: the petals purple, obcordate: at the bottom of the lamina or broad spreading part are two or four small upright white blunt appendicles: the germ is ovate, surrounded by a nectary at the base: the capsule one-celled, with ten teeth at the mouth: seeds gray, somewhat rugged. It is a native of many parts of Europe.

There is a variety with double flowers, cultivated in gardens by the name of Red Bachelor's Buttons, which is an ornamental plant, and continues long in flower.

The sixth species has the stalks branched out much more than in the fifth sort, being weaker and more flaccid: the leaves are longer and more veined: the flowers stand singly upon pretty long peduncles, and are not produced in clusters as in that; it is very hairy, the calyx is more swollen, and it flowers a month after it. And Dr. Withering remarks, that the petals on the male plant have the laminæ divided down to the claws, but in the female they are only cloven half way down. Dr. John Sibthorp also states that the capsules in the fifth are roundish, and that its scentless flowers stand open through the day; while this has conical capsules, and its odoriferous flowers open only towards evening. This also prefers a dry soil, while that spreads in a moist one. It is common in Siberia.

There are varieties with purple or blush-coloured flowers; with quadrifid petals; with hermaphrodite flowers; with double flowers, cultivated in gardens by the name of Double White Bachelor's Buttons.

Culture.—They may be increased with facility in the single sorts by seed, and parting the roots; and in the doubles by dividing or slipping the roots, and sometimes by cuttings of their stalks.

The seed should be sown in the early spring, as in March, in a bed or border of light earth, in an eastern aspect, each sort separate, raking them in lightly, or they may be sown in small drills. The plants come up in two or three weeks, when they should have occasional waterings and hand weedings: and when the plants are two or three inches high, be planted out in beds or borders, in rows six inches asunder, watering them till fresh rooted, letting them remain till the autumn or following spring, when they should be transplanted where they are to remain.

Both the single and double may be increased by slipping the roots; but it is more particularly applicable to the double sort, as they cannot with certainty be obtained from seed: the season for performing this work is the autumn, after the stalks decay, when the whole root may either be taken up, and divided into as many slips as are furnished with proper root-fibres, or the main root stand, and as many of the outer offsets as seem convenient be slipped off: these slips, when strong, should be planted at once where they are to remain; but when rather small and weak, it is better to plant them in nursery-rows, half a foot asunder, to remain a year, and then transplant them for good where they are to stand.

The planting of cuttings of the stalks is mostly practised for the double scarlet sort, when it increases but sparingly by offsets of the root. It is performed in summer, when the stalks are well advanced in growth, but before they flower, or have become hard and woody. Some of them should be cut off close to the bottom, and divided into lengths of from three to five joints, planting them in an easterly border of rich moist loamy earth, two-thirds of

their length into the ground, leaving only one joint or eye out, watering them directly, and repeating it occasionally with necessary shade in hot weather. They will be well rooted, and form proper plants for transplanting in the autumn. If the cuttings, as soon as planted, are covered down close with hand-glasses, it will greatly promote their rooting, so as to form stronger plants before the winter season comes on.

The only culture they require afterwards is clearing them from weeds in summer, and supporting with stakes them which need it, cutting down and clearing away the decayed stalks in the autumn.

Of the third sort, as being rather more tender, some plants should be planted in pots, for moving under the protection of a frame or greenhouse in the winter season.

They are all very ornamental for the pleasure-ground, particularly the doubles, and prosper in any common soil, remaining in all weathers unhurt, being of many years' duration in root; and, when of some standing, send up many stalks every spring, terminated by numerous flowers, making a fine appearance in summer. The Scarlet Double Lychnis claims the preference, though the single scarlet sort is also very showy. And all the other species in their respective double-flowered states are ornamental. They are all kept in the nurseries for sale. In planting out, the tallest growers should be placed the most backward, and the others more towards the front.

LYCIUM, a genus containing plants of the shrubby exotic kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Luridæ*.

The characters are: that the calyx is a subquinquefid perianthium, obtuse, erect, very small, permanent: the corolla monopetalous, funnel-form: tube cylindric, spreading, incurved: border five-parted, obtuse, spreading, small: the stamina have five awl-shaped filaments, from the middle of the tube, shorter than the corolla, closing the tube with a beard: anthers erect: the pistillum is a roundish germ: style simple, longer than the stamens: stigma bifid, thickish: the pericarpium is a roundish berry, two-celled: the seeds several and kidney-form: the receptacles convex, affixed to the partition.

The species are: 1. *L. Afrum*, African Box-thorn; 2. *L. barbarum*, Willow-leaved Box-thorn; 3. *L. Europæum*, European Box-thorn; 4. *L. Tartaricum*, Tartarian Box-thorn.

The first rises with irregular shrubby stalks ten or twelve feet high, sending out several crooked knotty branches, covered with a whitish bark, and armed with long sharp spines, upon which grow many clusters of narrow leaves; these thorns often put out one or two smaller on their sides, which have some clusters of smaller leaves upon them: the branches are garnished with very narrow leaves an inch and a half long, and at the base of these come out clusters of shorter and narrower leaves: the flowers come out from the sides of the branches, standing upon short foot-stalks, and are of a dull purple colour: the berry is of a yellowish colour when ripe, very dark red, inclosing several hard seeds. It usually flowers in June and July, and the seeds ripen in the autumn; but frequently a few flowers come out in all the summer months. It is a native of the Cape.

The second species is a weak shrub, nodding and decumbent unless supported: the bark of the branches whitish: the flowers from each bud from two to five, each on its proper peduncle. It differs from all the other sorts in having the mouth of the calyx two-lobed, or sometimes three-lobed: the border of the corolla spreading, with the throat pale streaked with black, and purple or pale red within. It is a native of Europe, Asia, and the Cape, flowering from May to October.

There are several varieties. The first has a shrubby stalk seven or eight feet high, sending out several irregular branches, armed with strong spines, and furnished with short thick leaves: the flowers, which come out from the side of the branches are small and white. They appear in July and August, but do not produce seeds in this climate.

The second has the stalk four or five feet high, sending out many irregular branches, covered with a very white bark, and armed with a few short spines: the leaves are about three inches long, and one inch broad in the middle, alternate, pale green. The flowers appear in June and July, and are succeeded by small round berries that ripen in the autumn, when they become as red as coral.

The third rises with weak irregular diffused branches to a great height, requiring support: some of these branches have in one year been upwards of twelve feet long: the lower leaves are more than four inches long, and three broad in the middle; they are of a light green and a thin consistence, placed without order on every side the branches. As the shoots advance in length, the leaves diminish in size, and towards the upper part are not more than an inch long and a quarter of an inch broad; sitting close to the stalks on every side. The flowers come out singly at every joint towards the upper part of

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1 *Lychnis chalcedonica* Scarlet Lychnis

2 *Leucojum vernum* Spring snow flake

3 *Lysimachia Nummularia* Creeping Moneywort

the branches, on short slender peduncles, and are of a pale colour with short tubes; the brims are spread open, broader than either of the former sorts, and the style is considerably longer than the tube of the corolla. It flowers in August, September, and October, retaining its leaves till November, and is a native of China.

The third is able to stand upright without support; differing from the above in having the leaves, though lanceolate, not flat but oblique or flexuose: the branchlets flexuose, not rendered angular by a line running down from the petiole; the surface not smooth, but subtomentose; and finally, spines from every bud. It differs from the first in having lanceolate leaves, and round flexuose branchlets. It is a native of the South of Europe.

The fourth species is an elegant shrub, on account of the whiteness of the branches, rods, or twigs, which are many, a foot or eighteen inches long or more, branched, ascending: the spines alternate, awl-shaped, rigid, spreading, white or yellowish, surrounded with leaves and flowers at the base: the leaves are sessile, fleshy, blunt: flowers from the upper part of the twigs among the leaves, two or three to each spine, on short peduncles: the berries the size of a currant, black and succulent. It is a native of Tartary. It differs from the third sort in size, and the colour and form of the flower.

Culture.—These plants may all be increased by seeds, cuttings, or layers.

The seeds should be sown in the autumn soon after they are ripe, in pots, being plunged into an old tan-bed in winter, and covered with the glasses in frosty weather; but in mild weather be open to receive moisture; in the following spring the pots should be plunged into a moderate hot-bed, to bring up the plants, which must be inured to bear the open air as soon as the danger of frost is over, and when they are three inches high, be shaken out of the pots, and each planted in a small separate pot filled with loamy earth, being placed in the shade till they have taken new root, when they may be removed to a sheltered situation, to remain till the autumn, when they should be either removed into the green-house, or placed under a hot-bed frame, to shelter them from hard frost. They must at first be kept in pots, and treated in the same way as myrtles, and other hardy green-house plants; but when they are grown strong, a few of them may be planted out in the open ground in warm situations, where they stand moderate winters, but are commonly destroyed by hard frosts.

The cuttings should be made from the young shoots, and be planted in a shady border in July, being duly watered; and when they have taken root, be treated in the same way as the seedling plants. This is the usual mode of increasing them, as some sorts never produce seeds in this climate.

In the third sort the cuttings should be planted in the spring, in an eastern border; and the plants should not be removed till the autumn, when they may be planted to cover walls, as the branches are too weak to support themselves.

The third variety may also be increased by dividing and planting its creeping roots.

The layers must be made from the young branches, and be laid down in the spring; and when rooted in the autumn, taken off, and managed as in the other methods.

The hardy sorts afford variety in warm situations in the open ground, and the other sorts among green-house collections.

LYSIMACHIA, a genus containing plants of the hardy herbaceous biennial and perennial kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Rotaceæ*.

The characters are: that the calyx is a five-parted perianthium, acute, erect, permanent: the corolla one-petalled, wheel-shaped: tube none: border five-parted, flat: divisions ovate-oblong: the stamina have five awl-shaped filaments, opposite to the divisions of the corolla: anthers acuminate: the pistillum is a roundish germ: style filiform, the length of the stamens: stigma obtuse: the pericarpium is a globular capsule, mucronate, one-celled, ten-valved (five-valved): the seeds very many, and angular: the receptacle globular, very large, dotted. (free.)

The species cultivated are: 1. *L. Ephemerum*, Willow-leaved Loose-strife; 2. *L. dubia*, Purple-flowered Loose-strife; 3. *L. stricta*, Upright Loose-strife.

The first has a perennial root: the stems several, upright, more than three feet high: the leaves narrow, smooth, and at the base of these come out short side branches, with smaller leaves of the same shape: the flowers are produced in a long close upright spike, at the top of the stalk: the corolla is white: the stamens longer than the corolla. It is very distinct from the second sort by its size, five-valved capsules, white flowers, and leaves without dots. It is a native of Spain, flowering from July to September.

The second species is an annual (biennial) plant, too tender for the open air of this climate: it agrees with the first sort in habit, structure, and glaucous colour: it has no dots

under the leaves: the petals are acuminate, a little longer than the calyx, converging, and deep red: the stamens are longer than the corolla, with brown anthers: and the flowers sessile in a spike. It is nearly allied to the first sort, and is a native of the Levant, flowering in July and August.

The third has the stem erect, four-cornered, smooth: the leaves quite entire, acute, smooth, dotted: the racemes simple: the pedicels in a sort of whorl, filiform, an inch long: the bractes lanceolate, very short: the divisions of the calyx lanceolate, smooth, dotted with red: the petals three times as long as the calyx, yellow, with red stripes and dots, and two dark-red spots: the stamens shorter than the corolla. It is a native of North America, flowering in July and August.

Culture.—These may all be readily increased either by sowing the seeds in the autumn, as soon as they are fully ripened, on a moist border, with an eastern aspect; or by parting the roots, and planting them out at the same season, in the same situations.

The plants should afterwards be kept clean, and in the first method removed into the situations where they are to remain in the autumn.

In the second sort the seeds should be sown on a hot-bed.

The third sort is increased by planting the bulbs thrown out from the axils of the leaves.

They all afford ornament and variety in the borders and other parts of pleasure-grounds.

LYTHRUM, a genus containing plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Dodecandria Monogynia*, and ranks in the natural order of *Calycanthemæ*.

The characters are: that the calyx is a one-leafed perianthium, cylindric, striated, with twelve teeth, alternately smaller: the corolla has six oblong petals, bluntish, spreading, with the claws inserted into the teeth of the calyx: the stamina have twelve filiform filaments, the length of the calyx; the upper ones shorter than the lower: anthers simple, rising: the pistillum is an oblong germ: style awl-shaped, the length of the stamens, declined: stigma orbiculate, rising: the pericarpium is an oblong acuminate capsule, straight, two-celled or one-celled: the seeds numerous and small.

The species cultivated is *L. Salicaria*, Common or Purple Willow-herb.

Other species may be introduced into cultivation.

It has a perennial root, thick branched, somewhat woody, widely extended: the stem from two or three to four or six feet high, upright, tinged with red, below smooth and four-cornered, above pubescent and five-cornered; corners sharp, membranaceous, rugged: the upper branches scattered, lower opposite, four-cornered, rugged, and slightly downy, upright, shortish, numerous: the leaves sessile, embracing, about three inches long, smooth above, underneath slightly downy, somewhat rugged, veined, spreading, all opposite, or all alternate, or the lower opposite, and the upper alternate: the flowers in clusters, placed at a little distance from each other, in the axils of the leaves, each consisting of about eight flowers (six or twelve), together forming a long leafy spike. It is a native of most parts of Europe, flowering late in the summer.

There are several varieties; in the first of which the stalks are upright and branching, three feet high: the leaves cordate-ovate, an inch long, and three quarters of an inch broad, downy, and placed by threes: the flowers in long spikes, disposed in thick whorls, with spaces between each; they are of a fine purple colour. It is smaller than the common sort, much more downy, and the leaves broader. It often varies with three leaves to a joint; in which case the stem is six-cornered; and sometimes even with four leaves at a joint. And Linnæus mentions a variety, in which the stem is a foot high and simple: the leaves alternate, cordate-lanceolate, sessile: the flowers from each upper axil, solitary, and sessile.

There is also a variety which does not grow more than a foot high: the leaves smooth, growing by threes, narrower and shorter than the common sort: the flowers in terminating spikes, of a light purple colour, appearing in July. Likewise, in which the stalks are slender, not more than nine or ten inches long, spreading out on every side: the lower part has oblong-ovate leaves, placed opposite: on the upper part the leaves are narrower and alternate: the flowers come out singly from the side of the stalks at each joint; they are larger than those of the common sort, and of a deeper purple colour; making a fine appearance in July, when they are in full beauty and perfection.

Culture.—This sort and varieties may be readily increased by parting the roots in autumn, and planting them out in the situations where they are to remain. They may likewise be raised from seed sown at the same time; but the first is the readiest method.

They delight in a rather moist soil.

All of them are highly ornamental in the larger borders, clumps, and other parts of pleasure-grounds, being placed towards the back parts.

MACAW-TREE. See Cocos.

MACEDONIAN PARSLEY. See Bubon.

MAD APPLE. See Solanum.

MADDER. See Rubia.

MADWORT. See Alyssum.

MAGNOLIA, a genus containing plants of the evergreen and deciduous tree kinds.

It belongs to the class and order *Polyandria Polygynia*, and ranks in the natural order of *Coadunatæ*.

The characters are: that the calyx is a three-leaved perianthium: leaflets ovate, concave, petal-shaped, deciduous: the corolla has nine oblong petals, concave, blunt, narrower at the base: the stamina have numerous filaments, short, acuminate, compressed, inserted into the common receptacle of the pistils below the germs: anthers linear, fastened on each side to the margin of the filaments: the pistillum has numerous germs, ovate-oblong, two-celled, covering a club-shaped receptacle: styles recurved, contorted, very short: stigmas longitudinal of the style, villose: the pericarpium is an ovate strobile, covered with capsules, which are compressed, roundish, scarcely imbricate, clustered, acute, one-celled, two-valved, sessile, opening outwards, permanent: the seeds two or one, roundish, berried, hanging by a thread from the sinus of each scale of the strobile.

The species cultivated are: 1. *M. grandiflora*, Laurel-leaved Magnolia; 2. *M. glauca*, Swamp Deciduous Magnolia; 3. *M. acuminata*, Blue Magnolia; 4. *M. tripetala*, Umbrella Magnolia, or Umbrella Tree.

The first rises with a straight trunk of two feet or more in diameter to the height of seventy or eighty feet, or more, dividing into many spreading branches, that form a large regular head: the leaves are nine or ten inches long, and three inches broad in the middle, of a thick consistence, resembling those of the common laurel, but much larger, entire, but a little waved on their edges, of a lucid green on the upper surface, and sometimes russet-coloured underneath; they are sessile, placed without order on every side the branches, and continue green throughout the year, falling off only as the branches extend, and new leaves are produced: the flowers are produced at the ends of the branches; are very large, and are composed of eight or ten petals, narrow at their base, but broad, rounded, and a little waved at their extremities; they spread open very wide, are of a pure white colour, having an agreeable scent. In its native country it begins to produce flowers in May, and continues a long time in flower, so that the woods are perfumed with their odour the greatest part of the summer: but in this climate it seldom begins to flower till the middle or end of June, and does not continue long in beauty. It is a native of Florida and Carolina.

It varies with broad leaves, and with narrow leaves.

The second species grows about fifteen or sixteen feet high, with a slender stem, covered with a smooth whitish bark: the wood is white and spongy: the leaves thick and smooth, resembling those of the bay, entire, dark green on their upper surface, but whitish or glaucous and a little hairy underneath: the flowers are produced in May and June at the extremity of the branches; are white, and have an agreeable sweet scent, with only six concave petals: after these are past the fruit increases to the size of a walnut, with its cover an inch or more in length, and three-fourths of an inch in diameter, of a conical shape: the seed is about the size of a kidney-bean: this fruit is at first green, afterwards red, and when ripe of a brown colour. Where it grows naturally, there is a succession of flowers on the trees for two months or more: but in this climate there are seldom more than twelve or fourteen flowers on a tree, and those of short duration. It is a native of North America.

The young plants often retain their leaves through the greatest part of winter; but, when three or four years old, constantly cast their leaves by the beginning of November.

There is a variety with long leaves, which is evergreen.

The third grows sometimes to the height of thirty or forty feet, in its native state, and the trunk is eighteen inches or more in diameter: the leaves near eight inches long, and five broad: the flowers come out early in the spring, are composed of twelve large blueish-coloured petals: the fruit is about three inches long, somewhat resembling a small cucumber; whence the inhabitants of North America call it Cucumber Tree: the wood is of a fine grain, and an orange colour. It is a native of North America.

The fourth species grows from sixteen to twenty feet high, with a slender trunk, covered with a smooth bark, and dividing into several branches: the leaves are remarkably large, often from twelve to fifteen inches or more in

length, and five or six in width, narrowing to a point at each extremity, placed at the ends of the branches in a circular manner, somewhat like an umbrella, whence its name: the flowers are composed of ten, eleven, or twelve large, oblong, white petals; the outer ones hanging down: the seed-vessels are oblong, conical, between three and four inches in length, and about an inch and half in diameter. The wood is soft and spongy; and the leaves drop off at the beginning of winter. It is a native of Carolina, Virginia, &c.

Culture.—These plants may all be increased by seed, layers, and cuttings.

In the first mode, the seed, which is received annually from America, preserved in sand, early in the spring, should be sown as soon after as possible in pots of light rich earth, half an inch deep, plunging them in a moderate hot-bed, to bring up the plants an inch or two in height, or in the common earth under a warm wall or hedge, or in a frame, in the full sun, till the middle or latter end of April, then replunging them in an easterly border open to the morning sun; giving moderate sprinklings of water in dry weather. The plants will rise the same year; those in the hot-bed, probably in April, and the others in May, inuring those in the first situation timely to the full air. The plants should all summer be regularly supplied with water, and at the approach of winter be removed into a green-house, or rather under a garden-frame, to be sheltered from frost all winter, indulging them with the open air in mild weather. If the pots be plunged in a bark hot-bed, &c. about March, under a frame, two or three months, it will forward the plants greatly; being careful to give water, and harden them to the open air gradually, so as to be removed into it in their pots fully in June, to remain till the autumn, when they should be allowed shelter in winter, as before. The spring following, they should be planted into separate pots, and plunged into a hot-bed as before to set them forward, giving water, occasional shade, and the benefit of free air; and in June removing the pots to a shady border for the remainder of the summer. In winter they should have shelter as before, from severe frost, but have the full air in all open weather. They require the same care for two or three winters, when some of them may be turned out of the pots with balls of earth about their roots, into the full ground, in a warm sheltered situation, particularly the deciduous kinds; but the first or evergreen sort should not be too soon exposed to the winter's cold, but be continued in occasional shelter in the above manner four or five years, till two, three, or more feet high; and when turned out, matted occasionally in severe winters, retaining some in pots to be managed as green-house plants of the more hardy kind.

The layers should be laid down in autumn or spring, choosing the young pliable shoots for the purpose, giving them a gentle twist, or a slit in the part laid into the earth. Some will be well rooted in one year, others probably not in less than two; then take them off, and plant each in a pot in the early spring, plunging them in a moderate hot-bed for a month or two, to promote their growing freely at first, and they will form good strong plants by the following autumn, allowing them shelter in winter for a year or two, when they may be planted out.

The cuttings should be made from the short young shoots of the preceding year, and be planted in pots of good earth, plunging them to the rims in the common or stove hot-bed, giving water and occasional shade; some of them will be rooted the same year, when they must be inured by degrees to the open air, after which they may be managed as the layers.

The first or evergreen sort is one of the most beautiful trees in nature, both in its growth, and in the luxuriance of its noble leaves, which render it singularly conspicuous at all seasons.

The deciduous sorts are also highly ornamental trees, and may be introduced into clumps and shrubberies, where by their fine foliage they exhibit an elegant variety.

All the different species are cultivated in the nurseries, for sale, from which they may be taken up and planted out in the early spring or autumn months; but the former is the better.

In their disposition in the shrubbery, as they are rather tender in their early growth, they should have a sheltered sunny situation, in a rather dry soil, being planted in the most conspicuous places, and not too closely crowded with other shrubs.

They have also a good effect when disposed singly in different parts, in open spaces of short grass-ground, in sheltered situations; especially the first sort.

MAHERNIA, a genus containing plants of the shrubby exotic kind, for the green-house.

It belongs to the class and order *Pentandria Pentagynia*, and ranks in the natural order of *Columniferæ*.

The characters are: that the calyx is a one-leafed perianthium, five-cleft, bell-shaped; with awl-shaped longer teeth; permanent: the corolla has five heart-shaped petals, oblong, spreading, twice as long as the calyx: nectaries five,

obcordate, pedicelled, surrounding the germ, shorter than the calyx: the stamina have five filaments, capillary, placed on the nectary, united at the base, shorter than the calyx: anthers oblong, acuminate, erect: the pistillum is a subpedicelled germ, obovate, five-angled: styles five, bristle-shaped, erect, the length of the petals: stigmas simple: the pericarpium is an ovate capsule, five-celled, five-valved: the seeds few, and kidney-form.

The species cultivated are: 1. *M. pinnata*, Wing-leaved Mahernia; 2. *M. incisa*, Cut-leaved Mahernia.

The first rises with a shrubby stem near three feet high, sending out many slender delicate branches, covered with a reddish bark: the flowers come out from the side of the branches in small clusters, are of a lively red when they first open, and hang down like little bells, commonly two together; appearing from June to August and September. It is a native of the Cape.

In the second species, the stalks to the naked eye discover a manifest roughness; with a magnifying glass, it appears that they are beset on every side with little protuberances, whence issue tufts of pellucid hairs, and here and there a single hair is discoverable with a small red viscid globule at its extremity: a portion of the stalk, when highly magnified, somewhat resembles that of the creeping Cereus: the leaves, which are not so manifestly hairy as the stalk and calyxes, are deeply jagged on the edges, and somewhat resemble those of *Pelargonium Tricolor:* the flowers when in bud are of the richest crimson: as they open they incline to a deep orange, and finally become yellowish. It is a native of the Cape.

Culture.—These plants may be increased by planting cuttings of the young branches in the summer season singly, in pots of light mould, watering them, and plunging them in a hot-bed till they have stricken root. When they have become well rooted, they may be removed into the green-house for protection during the winter season; being managed as the less tender plants of this sort.

They afford variety among other potted plants of a similar kind.

MAHOGANY TREE. See SWIETENIA.

MAIDENHAIR TREE. See SALISBURIA.

MALABAR NUT. See JUSTICIA.

MALE BALSAM APPLE. See MOMORDICA.

MALLOW. See MALVA.

MALLOW, INDIAN. See SIDA.

MALLOW TREE. See LAVATERA.

MALLOW, VENICE. See HIBISCUS.

MALOPE, a genus containing a plant of the herbaceous kind.

It belongs to the class and order *Monadelphia Polyandria*, and ranks in the natural order of *Columniferæ*.

The characters are: that the calyx is a double perianthium: outer three-leaved, broader: leaflets cordate, acute, permanent: inner one-leafed, half-five-cleft, more erect, permanent: the corolla has five obcordate petals, præmorse, spreading, fastened to the tube of the stamens at the base: the stamina have numerous filaments, at bottom united into a tube, above, at, and below the apex of the tube, separate and loose: anthers almost kidney-form: the pistillum has roundish germs: style simple, the length of the stamens: stigmas many, simple, bristle-shaped: the pericarpium is a roundish capsule, many-celled: cells as many as there are stigmas, conglomerated into a head: the seeds solitary and kidney-form.

The species cultivated is *M. Malacoides*, Betony-leaved Malope.

In the whole plant it has greatly the appearance of the mallow, but differs from it in having the cells collected into a button, somewhat like a blackberry: the branches spread, and lie almost flat upon the ground, extending a foot or more each way: the flowers are produced singly upon long axillary peduncles, and are in shape and colour like those of the mallow. It is a native of Tuscany, &c.

Culture.—This may be increased by sowing the seeds, in the places where the plants are designed to remain, as it does not bear transplanting well: when they are sown upon a warm border in August, the plants also frequently stand through the winter, and flower early the following season, so as to produce good seeds: but when sown in the spring, this is rarely the case.

The plants sown in the spring in pots should be protected in winter under a frame. They seldom continue longer than two or three years.

They afford variety among other plants in the borders, &c.

MALPIGHIA, a genus containing plants of the exotic evergreen shrubby kind, for the stove.

It belongs to the class and order *Decandria Trigynia*, and ranks in the natural order of *Trihilatæ*.

The characters are: that the calyx is a five-leaved erect perianthium, very small, permanent, converging: there are two melliferous glands, oval and gibbous, fastened to the calycine leaflets on the outside and at bottom: the corolla has five petals, kidney-form, large,

plaited, ciliate, spreading, concave; with long linear claws: the stamina have ten broadish filaments, awl-shaped, erect, placed in a cylinder, united below, small: anthers cordate: the pistillum is a roundish germ, very small: styles three, filiform: stigmas blunt: the pericarpium is a globular berry, torulose, large, one-celled: the seeds three, bony, oblong, blunt, angular; with an oblong blunt kernel.

The species cultivated are: 1. *M. glabra*, Smooth-leaved Barbadoes Cherry; 2. *M. punicifolia*, Pomegranate-leaved Barbadoes Cherry; 3. *M. urens*, Stinging Barbadoes Cherry; 4. *M. nitida*, Shining-leaved Barbadoes Cherry; 5. *M. angustifolia*, Narrow-leaved Barbadoes Cherry; 6. *M. crassifolia*, Thick-leaved Barbadoes Cherry; 7. *M. verbascifolia*, Mullein-leaved Barbadoes Cherry; 8. *M. coccigera*, Scarlet Grain-bearing Barbadoes Cherry.

The first grows to the height of fifteen, sixteen, or eighteen feet, with several trunks, covered with a clay-coloured smooth bark, and dividing into many spreading branches, making a pleasant round head: the leaves are opposite, subsessile, acute, continuing all the year: the flowers are in axillary and terminating bunches, or umbels, on peduncles half an inch long, and about four flowers on each, of a bright purple: the pedicels have a single joint: the fruit red, round, the size of a cherry, smooth-skinned, having one or more furrows on the outside, and containing within a reddish, sweetish, not unpleasant, copious, juicy pulp.

It is found in the West-Indies, flowering from December to March.

The second species rises with a shrubby stalk from seven to ten or twelve feet high, dividing into several slender spreading branches, covered with a light brown bark: the flowers are produced in small umbels at the end of the branches, upon short peduncles: the corolla is pale rose-colour: the berry roundish, pulpy, with several furrrows, red when ripe, inclosing three or four hard angular seeds. It is of the same size and make with our common cherries, very succulent, and of a pleasant subacid taste; having much the appearance of the pomegranate. It is a native of the West-Indies.

The third is a shrub, which rises with a strong upright stem about three feet high, covered with a brown bark, sending out several side branches which grow erect: the leaves ending in acute points, sessile, covered with fine bristles, which do not appear unless closely viewed: these bristles are double-pointed, and sustained by pedicels of the same fragile transparent substance with themselves, descending from the middle of them: these are easily broken, but the bristles enter pretty deep in, and stick close to whatever has forced them off. The flowers come out upon long slender peduncles from the axils at each joint, four, five, or six together, in a sort of whorl. It flowers in July and August, (to October), and is found in the West-Indies.

The fourth species is a shrub, a fathom in height: the stem upright, round, even: the branches decussated, upright, round, covered with a shining bark: the leaves decussated opposite, oblong, blunt, with a convex margin, nerved, veined, firm, pale-green, shining, on short petioles: the racemes axillary, shorter than the leaves, many-flowered: the flowers peduncled, the same size as in the first sort, yellow: the berry three-lobed, three-seeded, and blood-red. It is a native of the West-Indies.

The fifth rises with a shrubby stalk seven or eight feet high, covered with a bright purplish bark, which is spotted and furrowed, dividing towards the top into several smaller branches: the leaves are numerous, about two inches long, and a quarter of an inch broad, acuminate, of a lucid green on their upper side, but of a russet brown on their under, where they are closely armed with stinging bristles: the flowers are from the side and at the end of the branches in small umbels, small, and of a pale-purple colour: the fruit small, oval, furrowed, and dark purple when ripe. It is a native of the West-Indies, flowering in June.

The sixth species is a tree, with the leaves a hand in length, thick, subpetioled, quite entire, pubescent above, tomentose underneath, commonly alternate: the racemes long, tomentose; and according to Brown, the upper branches terminate in loose bunches of flowers, each of the divisions being simple, as well as the top of the main supporter, which terminates also in a single spike. It is a native of the West-India islands.

The seventh has the leaves ending in the petioles, a foot long, villose, clothed underneath with a very close nap: the racemes long and villose. It is a native of South America.

The eighth species is a very low shrub, seldom rising more than two or three feet high: the stalk thick and woody, as are also the branches, which come out on every side from the root upwards, and are covered with a rough gray bark: the leaves lucid, half an inch long, and almost as much broad, appearing as if cut at their ends, where they

are hollowed in, and the two corners rise like horns, ending in a sharp thorn, as do also the indentures on the sides: the flowers come out from the side of the branches, upon peduncles an inch long, each sustaining one small pale blueish flower: the fruit is small, conical, furrowed, changing to a purple red colour when ripe. It is found in the West-Indies.

Culture.—These plants may be increased by sowing the seeds in the spring, in pots of light rich earth, and plunging them in a hot-bed. When the plants have attained a few inches in growth they should be planted out into separate small pots, re-plunging them in a bark hot-bed in the stove, where they should remain, the two first winters, being afterwards placed in a dry stove, and kept in a moderate warmth, water being occasionally given in small quantities.

They afford ornament among collections of plants of similar kinds.

MALVA, a genus containing plants of the herbaceous, annual, biennial, perennial, and shrubby kinds.

It belongs to the class and order *Monadelphia Polyandria*, and ranks in the natural order of *Columniferæ*.

The characters are: that the calyx is a double perianthium: outer three-leaved, narrower: leaflets cordate, acute, permanent: inner one-leafed, half-five-cleft, larger, broader, permanent: the corolla has five obcordate petals, præmorse, flat, fixed to the tube of the stamens at the base: the stamina have numerous filaments, united below into a tube, seceding and loose at the top and surface of it: anthers kidney-form: the pistillum is an orbicular germ: style cylindric, short: stigmas very many, bristly, the length of the style: the pericarpium is a roundish capsule, composed of very many cells, (as many as there are stigmas,) two-valved, placed in a whorl about a columnar receptacle, finally falling: the seeds are solitary, very seldom two or three, kidney-form.

The species cultivated are: 1. *M. spicata*, Spiked Mallow; 2. *M. Americana*, American Mallow; 3. *M. Peruviana*, Peruvian Mallow; 4. *M. Caroliniana*, Creeping Mallow: 5. *M. Orientalis*, Oriental Mallow: 6. *M. verticillata*, Whorl-flowered Mallow; 7. *M. crispa*, Curled Mallow; 8. *M. Ægyptia*, Palmated Mallow; 9. *M. Alcea*, Vervain Mallow; 10. *M. moschata*, Musk Mallow; 11. *M. Capensis*, Gooseberry-leaved or Cape Mallow.

The first has the stem pale-green, two or three feet high, and branched: the leaves are almost round, an inch and quarter long, and three quarters of an inch broad at the base, pale-green, smooth, on petioles three quarters of an inch in length: the tops of the twigs and branches, for the length of an inch, are thick set, in a spike with orange-coloured flowers, in very hirsute calyxes. It is a native of Jamaica, flowering in September and October.

The second has an annual root: the stem is a foot high, stiff, round, somewhat hairy: branches few, short, upright, from the lowe axils: the leaves scarcely tomentose: peduncles axillary, upright, solitary, one-flowered: the spike terminating, with many sessile flowers, expanding after noon: the corolla yellow. It is a native of North America, flowering in June and July.

The third is also an annual plant: the stem from two to three feet high, with hairs thinly scattered over it, usually in pairs: the leaves seven-lobed, (five or three) plaited, smooth, veined, sharply serrate, on petioles the length of the leaf: the stipules ovate-lanceolate: the peduncles long, naked: the spike directed to one side, turned upwards, recurved before the flowers open: the corollas small, purple. According to Jacquin, the flowers are red: but others say, pale blue, and set very closely on the spikes, appearing in June. It grows naturally in Peru.

The fourth has an annual root: the stems creeping, eighteen inches and longer, round, putting out roots at the lower joints, hairy: the leaves villose, soft; those next the root large, roundish, gash-serrate, smaller and more deeply divided as they ascend, five-lobed and seven-lobed, all on long hairy petioles, gashed and serrate on the edge: the flowers are axillary and terminating, on almost upright peduncles, from an inch to an inch and half in length, small, the colour of Burgundy wine: the claws of a darker red. It is a native of Carolina.

The fifth species is an annual plant, with an upright stalk: the flowers are large, and of a soft red-colour. According to Martyn, the stalk is six feet or more in height, and the flowers not purple, but dark red, with the veins so dark as to be almost black. It was found in the Levant.

The sixth has the root annual, three feet high: the leaves cordate, five- or seven-angled, subcrenate, smooth, on long alternate petioles: the flowers are whitish red, small, on one-flowered peduncles. It is a native of China, and Cochinchina, flowering in June and July.

The seventh species is also annual: the stem upright, four or five feet high: the leaves curled on their edges: the stem thick, round, green, hirsute below, branched, from three to four

feet high: the lower leaves a hand wide, on long petioles; the upper ones smaller, on shorter petioles; the uppermost very small, almost sessile: all obscurely angular, sinuate, bright green, pubescent: the flowers sessile in the axils, over the whole stem and branches, small in proportion to so large a plant. It is a native of Syria, flowering from June to August.

The eighth is likewise an annual plant, with stalks about a foot long, smooth, and declining: the leaves on pretty long footstalks: the flowers single from the axils, and at the top in clusters: the calyxes large, acute: the corollas small, pale blue. It is a native of Egypt, flowering in June and July.

The ninth has the root long, branched, and perennial: the stem from two to three feet high, round, rugged, hairy: hairs in bundles, spreading: branches alternate: the leaves alternate, semiorbicular, five-parted to the base, with the lobes oblong, three- or five-parted, bright green, whitish underneath, pubescent, somewhat rugged: the petioles round, with very small awl-shaped stipules at the base: the flowers terminating, in panicles or bundles: the calyx small in proportion to the size of the corolla, pubescent; outer small, inner much larger: the corolla an inch and half or two inches long, five-parted to the base, bright purple; with blunt two-lobed segments. It is a native of many parts of Europe.

The tenth species has root-leaves roundish, kidney shaped, entire, except being crenate on the margin: the first stem-leaves three-lobed, divided half way down: side-lobes divided again into two or three, but not so deeply: above these they are three-lobed to the footstalk: lobes again deeply divided; divisions deeply jagged: higher ones five-lobed, lobes pinnatifid, segments of the upper ones more divided, and narrower; uppermost linear: the stem round, much branched, slightly hairy: at the origin of each branch, two lanceolate hairy stipules: the flowers crowded on the top of the stem and branches on short peduncles, and single ones from the axils of the upper leaves: petals heart-shaped, divided nearly to the base, pale red or flesh-coloured, with deeper veins. It differs from the ninth sort, with which it has been confounded, in having the stem not so tall, with solitary upright hairs rising from a prominent little point: the arils rough with hairs: the flowers of an ambrosial or musky scent: the musky smell is not however always to be perceived. Mr. Curtis, on cultivating both species together, found the ninth grow nearly to twice the height of this, and to be in every respect a stronger plant, and harsher to the touch. It is a native of many parts of Europe.

The eleventh rises with a woody stalk ten or twelve feet high, sending out branches from the side, the whole length: the stalks and branches are closely covered with hairs: the leaves are hairy, indented, on their sides, so as to have the appearance of a trilobate leaf: those on the young plants are three inches long and two broad at their base: but as the plants grow older, they are scarcely half that size: the flowers come out from the side of the branches, upon peduncles an inch long; they are of a deep red colour, shaped like those of the common mallow, but smaller. It flowers great part of the year, and is a native of the Cape.

There are varieties in which the stems are thicker and higher, of a brownish red colour: the leaves hirsute, broader, with wider segments, less deeply cut, but with the toothlets sharper and serrate: the whorls of fruit a little larger, and not muricated; and in which the hairs of the leaves and stem are simple, not compound: the flowers almost upright, not drooping.

Culture.—The ten first sorts are all capable of being raised from seeds, which, in the hardy kinds, should be sown in the situations where the plants are to grow, in patches of four or five in each, in the spring or beginning of autumn, covering them to the depth of half an inch. They may likewise be sown upon a bed of fine earth, and be afterwards removed to the places where they are to flower. Those which are natives of hot climates, should be sown in pots and plunged in a hot-bed.

When the plants in the two latter modes have attained some growth, they should be removed into their proper situations, or into other pots, to be afterwards managed according to the difference of the kinds.

The last sort and varieties may be raised also by seed, which should be sown upon a hot-bed, or in pots and plunged in it. When the plants have attained some growth, they should be removed into separate pots, replunging them in the hot-bed till fresh rooted, when they should be gradually inured to the full air, managing them afterwards in the same manner as other exotics of the green-house kind.

The hardy sorts afford a pleasing variety in the shrubbery and other parts, while those of the more tender and shrubby kind produce a good effect in the green-house, and among potted collections.

MAMMEA, a genus containing plants of the evergreen exotic tree kind.

It ranks in the class and order *Polygamia*

Monoecia, or *Dioecia*, and ranks in the natural order of *Guttiferæ*.

The characters are: that in the hermaphrodite, the calyx is a one-leafed perianthium, two-parted: divisions roundish, concave, coriaceous, coloured, spreading very much, deciduous: the corolla has four roundish petals, concave, spreading very much, subcoriaceous, longer than the calyx: the stamina have numerous bristle-shaped erect filaments, very short, inserted into the receptacle, ending in oblong, blunt, erect anthers: the pistillum is a roundish, depressed germ: style cylindric, erect, longer than the stamens, permanent: stigma capitate, convex: the pericarpium is a roundish fleshy berry, very large, acuminate with part of the style, with a coriaceous rind, one-celled: the seeds four, subovate, rugged, distinct from the flesh: male on the same or a different tree: the calyx, corolla, and stamina, as in the hermaphrodite.

The species is *M. Americana*, American Mammee.

It is a tall upright handsome tree, with a thick spreading elegant head, and a long downright tap-root, which renders it very difficult to transplant: the younger branchlets are quadrangular: the leaves oval or obovate, quite entire, blunt, extremely shining, leathery, firm, with parallel transverse streaks, on short petioles, opposite, from five to eight inches in length: the peduncles one-flowered, short, scattered over the stouter branches: the flowers are sweet, white, an inch and half in diameter: the fruit roundish, or obsoletely three-cornered or four-cornered according to the number of seeds, one or two of which are frequently abortive, varying in size from three to seven inches in diameter, being covered with a double rind: the outer leathery, a line in thickness, tough, brownish yellow, divided by incisures longitudinally decussated; the inner thin, yellow, adhering strongly to the flesh; which is firm, bright yellow, has a pleasant singular taste, and a sweet aromatic smell; but the skin and seeds are very bitter and resinous. It is eaten raw alone, or cut in slices with wine and sugar, or preserved in sugar. It is a native of the Caribbee islands.

Culture.—These trees may be raised from seeds procured from America, which should be sown in the early spring, in pots filled with light fresh mould, plunging them in a bark hot-bed, keeping the mould moist by occasional watering, when they will soon come up. The young plants should be often watered in dry weather. When they have attained some growth, they should be removed with earth about them, into other pots a little larger, being replunged in the hot-bed till fresh rooted, filling up the pots with fresh mould; due shade, air, and water being given. In the autumn they should be removed into the stove, where they must be kept, being shifted into other pots in the following spring; having regard not to over-pot them.

They may also be raised by placing the stones of the fruit under the pots upon the tan, more expeditiously than when planted in the mould of the pots.

They afford a fine variety among other stove plants.

MANGA. See MANGIFERA.

MANGIFERA, a genus containing a plant of the tree exotic kind for the stove.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Terebintaceæ*.

The characters are: that the calyx is a five-parted perianthium: divisions lanceolate: the corolla has five lanceolate petals, longer than the calyx: the stamina have five awl-shaped filaments, spreading, the length of the corolla: anthers subcordate: the pistillum is a roundish germ: style filiform, the length of the calyx: stigma simple: the pericarpium is a kidney-form drupe, oblong, gibbous, compressed: the seed is a kernel, oblong, compressed, lanuginose.

The species cultivated is *M. Indica*, Mango-tree.

It is a large spreading tree in its native state: the wood is brittle, brown, and used only for indifferent works: the bark becomes rugged by age: the leaves are seven or eight inches long, and two or more broad, lanceolate, quite entire, smooth, of a fine shining green, and a sweet resinous smell, terminating in points, and having several transverse parallel opposite ribs; they are on short petioles, and grow in bunches at the extremity of the branches. The flowers are produced in loose bunches at the end of the branches. The fruit, when fully ripe, is yellow and reddish, replete with a fine agreeable juice, being sometimes as big as a large man's fist. It grows naturally in most parts of India, &c.

There are several uncultivated varieties.

Culture.—As the vegetative property of the seed or nuts of this species does not seem to be long preserved, the readiest method to obtain plants, is to have a quantity of the nuts set in tubs of earth in the country where they grow naturally, and when the plants are grown a foot high, to have them shipped, placing a covering over them to defend them from the water and spray of the sea, being careful not to give them too

much water in the passage. When they arrive in a cold climate, they should be screened from cold. The plants should afterwards be set in pots filled with light kitchen-garden earth, and be placed in a dry stove, where, in warm weather, they should have fresh air daily, and in winter the air be kept up to temperate, as marked on the botanical thermometer; as they do not succeed well in the tan-bed.

Where the nuts are made use of, they should be sent over in wax to preserve their vegetative property.

They may also be increased from cuttings, in the manner of Gardenia, in this climate.

MANGO-TREE. See MANGIFERA.

MANGROVE GRAPE-TREE. See COCCOLOBA.

MANNA ASH. See FRAXINUS.

MANURE, such substances or materials, whether of the dung, compost, or other kinds, as are useful in the improvement of land, so as to produce good vegetable crops.

Materials of this kind are necessary to all soils, to repair them when exhausted by the growth of vegetables, and cure their defects; being thus beneficial in enriching and fertilizing such as are poor, and in rendering such as are strong or stubborn more light, loose, and friable, as well as those which are very light, loose, and dry, more compact and moist, and those that are too wet drier, &c. In this view, moist stiff land is the most improved by light Manures, which open and loosen its particles; very light land by the more heavy and moist sorts; and wet land by dry light composts. Some soils also require Manure annually, while others only once in two or three years. See DUNG, &c.

The most proper sorts of Manure for the use of the kitchen-garden are those of the stable, cow, sheep, and pigeon dung, soot, lime, loamy marle, shell marle, sea-weed, wood, whin, fern, and coal ashes, the vegetable mould of decayed tree-leaves, and decayed vegetables of all kinds, as cabbage leaves, haulm, weeds, &c. And to these may be added the fluid substance which drains from dunghills, which is capable of affording the nutrition of plants in a very high degree, from the large proportion of carbonaceous matter that it contains.

These materials may be applied either in a simple or compound state; but the latter method is probably in general the most eligible; as it is supposed by some, that if they have not undergone a proper degree of fermentation, they have the effect of giving a rank and disagreeable flavour to some fruits and vegetables; and when a large quantity is applied, of producing a considerable degree of unwholesomeness, tainting the juices of the plants. This effect is, however, much to be disputed, since the different substances are changed and elaborated in the vessels of the vegetables before they become fit for the purpose of their increase.

The author of the Scotch Forcing Gardener asserts that "a combination of stable dung, sea weed, lime, and vegetable mould, which has lain in a heap for three or four months, and has been two or three times turned during that period, will make an excellent Manure for most kinds of garden land." Also that of "cow dung and sheep dung, mixed with soot or any of the kinds of ashes;" and that "pigeon dung, marle, and vegetable mould, well mixed, will make an excellent Manure for heavy land; or even for lighter soils, provided the pigeon dung be used sparingly." But that "pigeon dung, lime, soot, ashes, &c., should never be applied in a simple state: the quantity of them required being comparatively small, and the regular distribution difficult without the admixture of other matter. He further observes, that he has "witnessed the astonishing effects of whin ashes alone, in producing herbage in a five or six fold degree; which was the more obvious, on account that the field on which they were applied was much alike in quality (a stiff, wet, clayey loam), and the ashes applied partially. The effect was visible for several successive years. Also, on the timber trees with which the field was afterwards planted." He conceives that "marle is an excellent Manure for almost any soil; and may be applied as a simple with as much propriety as any of the kinds of cattle dung, or even vegetable earth. The kind called shell marle is, he thinks, much to be preferred; and should be freely applied to strong lands, but sparingly to light: the loamy kind being best adapted to light lands."

When stable dung is used in a simple state, it "should not," he supposes, "be applied in too rank a state, nor should it be too much fermented. It should generally lie in a heap for two or three months; during which time it should be turned twice or thrice. A ton of it in this state is worth three that has been used in the hot-bed, and is a year old. This Manure, and indeed dung of any kind, when thus applied, should never be carried from the heap to the ground till it is to be digged in; as, by its exposure to the air, the virtues evaporate, and it is the less effectual."

And when made use of in a simple condition, he imagines "the necessity of the instant application of sea weed after its landing, is even greater than the above case; as it instantly

corrupts, and its juices not only evaporate, but flow downwards, and are lost. If this Manure is used as a compound, the heap wherein it is compounded should be more frequently turned on its account, that none of the juices may be lost, but that the other part of the compost may absorb them."

In his opinion "vegetable mould may either be used in a simple or compound state, and may be applied with equal propriety to all soils. None can," says he, "be hurt by it in any degree; since almost every plant will grow luxuriantly in it entirely, without the aid of any soil or manure whatever." He considers Manures as having the effect of correcting tenacity, crudity, and porosity in soils, exciting their fermentation, communicating nutritive matter, and affording nourishment to the roots of plants, by which the vegetation and perfect growth of plants is promoted.

There are considerable differences in the materials made use of as Manures, in their affording their nutritious properties, some affording them much more readily and more abundantly than others. This is the case with animal, vegetable, and all such matters as are rich in mucilage, the saccharine principle, and calcareous earth, and which readily afford carbon, phosphorus, and some gaseous fluids, such as the carbonic acid gas, oxygen, &c. while others which are greatly deficient in all or most of these principles, or which do not part with them easily, are found by experience much less beneficial in promoting the growth of vegetables.

As the effects and importance of Manure are now generally acknowledged and understood, it would appear to be the indispensable duty of the gardener and cultivator to be particularly careful in the collection of it, and also to distribute it with the most skilful frugality. "For this purpose, it is suggested that a well, cistern, &c. should be contrived so as to collect the dunghill drainings; and that in the application of Manure of any kind, the greatest care should be taken to divide it equally, according to the quantity to be applied." And further, that "the dunghill may be considerably increased by throwing the haulm, stalks, and leaves of all vegetables into a common heap, letting them remain till well rotted, and afterwards, or in the process of collection, mixing them with lime, marle, ashes, soot, &c. Watering the whole frequently with the drainings of the dunghill, would also greatly enhance its value."

The ground of gardens may often be greatly ameliorated and improved by proper draining, before the manures are applied, and sometimes by the use of sandy, gravelly, and other similar materials, that have the power of opening, and rendering it less close and adhesive.

MARANTA, a genus containing plants of the herbaceous perennial exotic kind.

It belongs to the class and order *Monandria Monogynia*, and ranks in the natural order of *Scitamineæ*.

The characters are: that the calyx is a three-leaved perianthium, lanceolate, small, superior: the corolla is one-petalled, ringent: tube oblong, compressed, oblique, bent in: border six-cleft: alternate outer segments ovate, equal, smaller; one of these the lowest, two the uppermost: two alternate, lateral, very large, roundish, representing the lower lip: uppermost small, two-parted: the stamina have membranaceous filaments, resembling a segment of the corolla: anthers linear, fastened to one edge of the filament: the pistillum is a roundish inferior germ: style simple, the length of the corolla: stigma obsoletely three-cornered, bent in: the pericarpium is a roundish capsule, obsoletely three-cornered, three-celled, three-valved: the seed single, ovate, wrinkled, and hard.

The species cultivated is *M. arundinacea*, Indian Arrow-root.

It has a thick, fleshy, creeping root, which is very full of knots, from which arise many smooth leaves, six or seven inches long, and three broad towards their base, lessening towards each end, terminating in points: they are of the consistence and colour of those of the reed, and stand upon reed-like foot-stalks, which arise immediately from the root: between these come out the stalks, which rise near two feet high; these divide upward into two or three smaller, and have at each joint one leaf of the same shape with the lower, but smaller: the ends of the stalks are terminated by a loose bunch of small white flowers, standing upon peduncles near two inches long: the flowers are cut into six narrow segments, which are indented on their edges; these sit upon the embryo, which afterwards turns to a roundish three-cornered capsule, inclosing one hard rough seed. It is a native of South America, flowering in June and July, in this climate.

The root washed, pounded fine, and bleached, makes a fine nutritive powder, which is made use of as food.

Culture.—These plants may be increased by dividing the roots and planting them in pots of light rich earth, in the spring, just before they begin to shoot, plunging them in the bark hot-bed of the stove, where they must be kept in general, being frequently refreshed with water, when in a state of growth, having free air, after they become of some strength.

They afford ornament and variety in stove collections.

MARIGOLD. See CALTHA.

MARJORAM. See ORIGANUM.

MARLE, a sort of fossile earthy substance, made use of for rendering stiff adhesive garden-lands more open and light.

It varies much in its nature, some being nearly of the nature of fuller's earth, and of a fat enriching quality, of which there are blue, gray, yellow, and red coloured; but the blue is esteemed the best. In other cases, it has the appearance of a kind of soft stone, or rather slate, of a blueish or gray colour, called stone or slate marle, being found commonly near river-sides, and the sides of hills, &c. and though hard when dug, easily dissolves by rain and frost. There are likewise calcareous, or shell and clay marles, the latter resembling a fat sort of clay or loam. The last sort is accounted good manure for improving light, loose, sandy, garden lands. See MANURE.

MARRUBIUM, a genus containing plants of the shrubby kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leafed, salver-shaped perianthium, rigid, ten-streaked; mouth equal, patulous, often ten-toothed: toothlets alternate, smaller: the corolla one-petalled, ringent; tube cylindrical: border gaping, with a long tubular opening: upper lip erect, linear, bifid, acute: lower reflex, broader, half-three-cleft; the middle segment broader, emarginate, the lateral ones acute; the stamina have four filaments, shorter than the corolla, concealed beneath the upper-lip, two longer; anthers simple: the pistillum is a four-cleft germ: stile filiform, of the same length and in the same situation with the stamens: stigma bifid: there is no pericarpium: calyx contracted at the neck, spread out at the mouth, inclosing the seeds: the seeds four, somewhat oblong.

The species cultivated are: 1. *M. Pseudo-Dictamnus*, Shrubby White Horehound; 2. *M. acetabulosum*, Saucer-leaved White Horehound.

The first rises with a shrubby stalk two feet high, dividing into many branches: the leaves are small, sitting pretty close to the stalks: the whorls of flowers not so large as those of the eighth sort: the rim of the calyx flat: the flowers white: the whole plant very hoary with a dense compact cotton. It is a native of the island of Candia, flowering from June to August.

The second species has the stems hairy, about two feet high: the leaves heart-shaped, rough on their upper side, and hoary on their under, deeply serrate: the whorls large: the border of the calyx flat; segments many, membranaceous, angular, and rounded at the top: the corolla small, pale purple, scarcely appearing out of the calyx: upper lip erect. Martyn observes, that after flowering time the border of the calyx grows out till it becomes twice as long as the tube, is naked and membranaceous, not villose as in the first species. It is also a native of the island of Candia, flowering from June to August.

Culture.—These sorts are capable of being increased by planting cuttings of the young shoots or branches in a shady border in the early spring, as about April. When the plants are well rooted, they may be removed into the places where they are to remain in the early autumn, with earth about their roots; but it is better to raise them at once in the places where they are to grow: when they grow strongly they should be screened from hard frosts in winter.

They continue the longest in poor dry soils, from their having a less luxuriant growth.

They afford variety in the borders, clumps, and other parts of pleasure grounds.

MARSH-ELDER. See VIBURNUM.

MARSH-MALLOW. See ALTHÆA.

MARSH-MARYGOLD. See CALTHA.

MARTYNIA, a genus containing plants of the tender herbaceous flowery kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a five-cleft perianthium, unequal, shrivelling: the corolla one-petalled, bell-shaped: tube spreading, ventricose, gibbous below at the base, mellifero-us: border five-cleft, obtuse, spreading: segments almost equal; the lower straight, the lowest more erect, concave, crenate: the stamina have four filiform filaments, curved inwards; the rudiment of a fifth filament within the upper pair of stamens, short like a cusp: anthers connected-converging: the pistillum is an oblong germ: style short, simple, the length of the stamens: stigma two-lobed: the pericapium is a woody oblong capsule, gibbous, quadrangular, two-furrowed on each side, acuminate, with the tip bent back, opening two ways, four or five-celled, inclosing the seeds as in a four-celled nucleus: the seeds several, oblong, berried.

The species cultivated are: 1. *M. diandra*, Two-stamened Martynia; 2. *M. proboscidea*, Hairy Martynia; 3. *M. perennis*, Perennial Martynia.

Other species may be cultivated.

The first is a handsome large plant, two feet high, straight, with large leaves, viscid, from small, slender, simple, white, villose hairs, each of which has a pellucid clammy globule at the top: the stem single, round, reddish green: the branches several, brachiate, dichotomous: the root-leaves none: the stem-leaves opposite, angular, with teeth remote by a long sinus, flaccid, green, white from the closeness of the villose hairs, veined; the largest six inches long: petioles on the stem horizontal, on the branches spreading, the same length with the leaf: the flowers several, on short peduncles, hanging down, so that the throat is turned towards the ground, disposed in a thyrse in the forks of the branches, two inches and a half long. It is a native of La Vera Cruz, in New Spain.

The second species is a large plant, two feet high, flexuose, herbaceous, villose, viscid: the stem single, round, pale green: the branches several, scattered, resembliug the stem: the root-leaves none: the stem-leaves opposite and alernate, stiffish, waved, veined, yellowish green, five inches long: the petioles horizontal, slightly channelled above, the length of the leaf: the flowers several, peduncled in a loose thyrse in the forks of the branches, two inches long. It is a native of America, flowering from June to August.

The third has a perennial root, thick, fleshy, divided into scaly knots, somewhat like those of Tooth-wort: the stems annual, about a foot high, thick, succulent, purplish: the leaves are oblong, thick, sessile, rough, and of a dark green, on their upper-side, but purplish underneath: the stem is terminated by a short spike of blue bell-shaped flowers, not spreading open so much at the rim as in the first sort. It is a native of Carthagena, in New Spain.

Culture.—The two first sorts may be increased by sowing the seeds in pots filled with light rich mould, in the spring, plungiug them in a bark hot-bed, giving water frequently. When the plants have attained a little growth, they should be removed into separate pots of the same sort of earth, replunging them in the bark bed, giving due water and shade, till they become properly rooted, when they must have free air in fine weather: after they are a little advanced in their growth, they should be removed into larger pots, and be replaced in the bark bed in the stove, due room being allowed them. They should be constantly kept in this situation, and be duly watered and supplied with fresh air in warm weather.

The third sort may be raised by dividing the roots, and planting them in the spring about the middle of March, in pots of light rich earth, and plunged in the bark-bed of the stove. When the plants are up, they should be duly watered in a slight manner, and in warm weather fresh air be freely admitted, keeping them from being shaded by other plants.

The cuttings of the shoots of the young stems planted in pots, and managed in the above manner, will also take root and form plants.

They afford ornament and variety among other stove plants.

MARVEL OF PERU. See MIRABILIS.

MARYGOLD. See CALENDULA.

MASSONIA, a genus containing plants of the herbaceous bulbous-rooted flowery perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Coronariæ*.

The characters are: that there is no calyx: the corolla has six lanceolate petals, spreading, upright, placed externally on the nectary, which is inferior, cylindrical, membranaceous, six-streaked, six-toothed: the stamina six, filiform, incurved, a little longer than the petals, inserted into the teeth of the nectary: anthers ovate, upright, yellow: the pistillum is a superior germ (in respect of the nectary): style awl-shaped, declining, the length of the stamens: stigma simple, acute: the pericarpium is a three-sided capsule, thickening above, obtuse, smooth, three-celled, three-valved, opening longitudinally at the corners: the seeds very many, angular-globular, and smooth.

The species cultivated are: 1. *M. latifolia*, Broad-leaved Massonia; 2. *M. angustifolia*, Narrow-leaved Massonia.

The first has the leaves next the root, one pair, smooth and even: the flowers aggregate, sessile, without any scape: the fruit not berried, but a membranaceous capsule; in which it differs from Hæmanthus. It is a native of the Cape, flowering in March and April.

The second species has the same structure; but the leaves are narrow, of an oblong-lanceolate form, and the segments of the corolla bent back at the end; whereas in the first they spread straight out. It is a native of the Cape, flowering in March and April.

Culture.—They may be increased by planting the off-sets from the roots, when the leaves drop off, in pots of sandy earth, plunging them in a hot-bed in the stove.

They are likewise capable of being raised from seeds sown in pots of the same sort of earth, plunging them in a hot-bed.

The plants should afterwards have a free air in the green-house, where they must be kept.

They afford variety in these collections.

MASTICK TREE. See PISTACIA.

MAT, GARDEN, a sort of covering formed of bass, which is much used in gardening, for sheltering various sorts of plants in winter and spring, in frosty and other cold weather; and in summer for shading many sorts of young or tender kinds occasionally from the sun; and many other purposes in the different garden departments.

They are of different sorts in regard to size and substance, there being small, middling, and large sizes: but for general use, those called Russia Mats are superior, both in size, substance, and durability. It may also be proper to have some of the smaller or middling sizes for particular occasions, and small gardens, in which, for some purposes, they may be more convenient than large ones. They are sold by most of the principal nursery and seedsmen, at from six or eight to twelve or fifteen shillings per dozen, according to size and strength.

They are also of essential use in all hot-bed work, for covering or spreading over the lights or glasses of the frames in the nights, in winter and spring, to exclude the external night cold; also occasionally in the day time in very severe weather, and heavy falls of snow or rain.

Likewise for occasionally covering several sorts of small young esculent plants with, in the full ground in beds and borders, in these seasons; as young lettuces, cauliflowers, small-sallad herbs, early radishes, &c. in the open beds, and under frames and hand-glasses, to defend them from cutting frosts, snow, and other inclement weather: and sometimes in raising, transplanting, or pricking out small or moderate portions of particular sorts of plants, both of the hardy and tender kinds, whether of the esculent or annual flowery kinds in the spring, on beds or borders of natural earth, or in hot-beds, without frames, by being arched over with hoops or rods. They are likewise extremely useful in the spring and summer, in hot, dry, sunny weather, in shading several sorts both in seed-beds before and after the young plants are come up, and in beds of pricked-out small young plants, to shade them from the sun till they take fresh root; as also for shading the glasses of hot-beds occasionally, when the sun is too powerful for particular sorts of plants in the heat of the day, as in Cucumbers, Melons, and various other kinds.

In kitchen and other garden districts furnished with wall-trees, they are of great use in spring to cover the trees of particular sorts with when in blossom, and when the young fruit is setting and advancing in its early growth after the decay and fall of the bloom; by which assistance, in cold winters and springs, when sharp frosts sometimes prevail, a tolerably good crop is often saved, while in trees fully exposed the whole is cut off by the severity of such weather.

In the flower-garden and pleasure-ground, Mats are also found useful on different occasions; in the former, in sheltering beds of curious sorts of choice flower-plants, and both in their advancing growth, to protect them from cold in winter and spring; and when in full bloom, to shade and screen the flowers from the sun and rain, to preserve their beauty more effectually, and to continue them longer in blow of a fine lively appearance; as well as to cover beds, &c. in raising various tender annual plants from seed in the spring; and in the latter occasionally in winter to defend some kinds of curious tender evergreens, &c. such as some of the Magnolias, Broad-leaved Myrtle, Olive, Tea Tree, &c. when standing detached and trained against walls.

And in nurseries, they are of considerable utility in the propagation and culture of numerous sorts of tender curious exotics, in defending them from cold, and shading from scorching sun, while they are in their minor growth, &c. They are necessary also for matting round bundles or baskets of tender or curious plants, when conveyed to a distance.

They are also of great use occasionally in severe winters on such glass-work as green-houses, hot-houses, forcing-frames, &c. in covering the glasses externally on the nights, and occasionally in the day time.

In using these Mats, when the ends are open or loose, they should be secured by tying the end threads or strings of the bass close and firm, otherwise they soon ravel out loose in that part, and are spoiled.

When made use of in the work of covering and shading, &c. they should generally in uncovering, if rendered wet by rain or snow, be spread across some rail, hedge, or fence, &c. to dry, before folding them together, that they may be preserved from rotting, otherwise they will not last long.

These Mats should never have any bass drawn out of them for tying up plants with, as is too commonly the practice, as by such means they are soon spoiled.

MATRICARIA, a genus containing plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoidæ*.

The characters are: that the calyx is common hemispherical: scales linear, imbricate, almost equal, not scariose: the corolla compound radiate: corollets hermaphrodite, tubular, numerous,

in a hemispherical disk: females in the ray several: proper of the hermaphrodite funnel-form, five-cleft, spreading: female oblong, three-toothed: the stamina to the hermaphrodites have five capillary filaments, very short: anthers cylindrical, tubular: the pistillum to the hermaphrodites an oblong germ, naked: style filiform, the length of the stamens: stigma bifid, spreading: to the females germ naked: style filiform, almost the length of the hermaphrodite: stigmas two, revolute: there is no pericarpium: calyx unchanged: the seeds solitary, oblong, without any pappus or down, to both sorts of florets: the receptacle naked, and convex.

The species cultivated is *M. parthenium*, Common Feverfew.

It has a perennial or biennial root, composed of a great number of fibres, and spreading wide on every side: the stem from two to three feet high, erect, firm, round, striated, slightly hairy, branched on every side: the leaves petioled, alternate, pale green, soft and tender, pinnatifid with two or three pairs of ovate jagged pinnas, and a larger one terminating, three-lobed, wedge-shaped, the middle lobe trifid, the side-lobes notched, roughish, slightly hairy: when magnified they appear as if sprinkled with minute spangles: the flowering heads solitary, sometimes on simple, but oftener on branched peduncles, forming together a loose umbel or rather corymb, hairy; the peduncles are thickest just beneath the flower, and about two inches long. It is a native of many parts of Europe, flowering in June.

There are several varieties, as with full double flowers, with double flowers, having the florets of the ray plane, of the disk fistular; with very small rays; with very short fistular florets; with naked heads, having no rays; with naked sulphur-coloured heads, and with elegant curled leaves.

Culture.—These plants may be raised from seeds, by parting the roots and cuttings.

The seeds should be sown in the spring, as March, upon a bed of light earth, and, when they are come up, planted out into nursery-beds, at about eight inches asunder, where they may remain till the middle of May when they should be taken up, with a ball of earth to their roots, and planted in the middle of large borders, or other parts, for flowering.

They should not be permitted to seed, as it often weakens and decays the roots; therefore, when their flowers are past, their stems should be cut down, which will cause them to push out fresh heads, whereby the roots may be preserved.

MAURITIA, a genus containing a plant of the exotic tree kind.

It belongs to the *Appendix Palmæ*, and ranks in the natural order of *Palms*.

The characters are: that the male-flowers are in an oblong ament, covered all round with flowers, closely approximating, with blunt scales between the flowers: the calyx is a one-leafed, cup-shaped perianthium, truncated, entire, three-sided, short: the corolla is one-petalled: tube short, the length of the calyx: border three-parted: segments equal, spreading a little, lanceolate, rigid (in a manner woody), blunt: the stamina have six filaments inserted into the throat of the tube, thick, very short: anthers linear, angular, the length of the segments of the corolla; three alternate ones extended between the segments of the corolla, and horizontal; the three others are generally erect, and pressed close to the channel or the segments: female, unknown.

The species is *M. flexuosa*, Maidenhair Tree, or Ginkgo.

It is a singular tree, almost without leaves: the branches are angular, flexuose, smooth, with short joints, thickening upwards, somewhat recurved, terminated by embracing sheaths: with a cup-shaped and sharper knee joint: from the axils of these come out over the whole stem, strobile-shaped aments, in two rows, spreading very much, sessile, with two large upright scales, sickle-shaped upwards at the base: the aments ovate-oblong, cylindric, covered with closely approximating, ferruginous flowers, spreading very much; falling off and leaving the ament, with its scales. It is a native of the woods of Surinam.

Culture.—It may be increased by laying the young branches in the summer season, and when they have stricken root fully, taking them off and planting them with earth about their roots in pots filled with light fresh mould, placing them in the green-house, where they must be kept.

Cuttings of the young shoots may also be planted in pots in the same manner, plunging them in a moderate hot-bed till they have stricken root, when they may be managed as the other plants.

It affords variety in the green-house, and when trained against walls; but in the last case must be sheltered by mats, in severe weather in winter.

MEALY-TREE. See VIBURNUM.

MEDEOLA, a genus comprising plants of the herbaceous climbing kind.

It belongs to the class and order *Hexandria Trigynia*, and ranks in the natural order of *Sarmentaceæ*.

The characters are: that there is no calyx,

unless the corolla be called so: the corolla has six petals, ovate-oblong, equal, spreading, revolute: the stamina have six awl-shaped filaments, the length of the corolla: anthers incumbent: the pistillum has the germs, three-horned, ending in styles: stigmas recurved, thickish: the pericarpium is a roundish berry, three-cleft, three-celled: the seeds solitary and heart-shaped.

The species cultivated are: 1. *M. Virginiana*, Virginian Medeola; 2. *M. asparagoides*, Broad-leaved Shrubby Medeola; 3. *M. angustifolia*, Narrow-leaved Shrubby Medeola.

The first has a small scaly root, from which rises a single stalk, about eight inches in height: there is one whorl of leaves, at a small distance from the ground, and at the top are two leaves, standing opposite: between these, come out three slender peduncles, which turn downwards, each sustaining one pale herbaceous flower, with a purple pointal. It is a native of Virginia, flowering in June.

The second species has the root composed of several oblong knobs, which unite at the top, like that of the Ranunculus; from which arise two or three stiff winding stalks, dividing into branches, and rising four or five feet in height, when they meet with support: the leaves are sessile, ending in acute points, of a light green beneath, but dark above: the flowers come out from the sides of the stalks, singly, or two on a slender short peduncle: the petals are dull white. It flowers in the beginning of winter, and the seeds become ripe in the spring. It is a native of the Cape.

The third has a root like the second, but the stalks are not so strong; they climb higher, but do not branch so much: the leaves are much longer and narrower, and are of a grayish colour: the flowers come out from the sides of the branches, two or three upon each peduncle: they are of an herbaceous white colour, shaped like those of the second sort, appearing about the same time; but have not produced fruit in this climate. It is likewise a native of the Cape, flowering from December to March.

Culture.—These plants may be increased by planting offsets, taken from the roots in the summer season, about July, in pots filled with good rich light mould, remaining in the open air till autumn, when they should be removed into the green- or hot-house; but the latter when intended to fruit. While the plants have a vigorous growth, they should be frequently refreshed with water; but as the stems decay, very little, especially when placed in an eastern aspect.

The second and third sorts may be raised from seeds, but they commonly remain long in the earth before they come up.

The first sort is sufficiently hardy to stand in the open air during winter.

They afford variety in green-house and stove collections, in the winter season.

MEDICAGO, a genus furnishing plants of the shrubby evergreen and herbaceous annual kinds.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leafed perianthium, straight, campanulate-cylindrical, half-five-cleft, acuminate, equal: the corolla papilionaceous: banner ovate, entire; the margins bent in, the whole bent back: wings ovate-oblong, affixed by an appendage to the keel, with the sides converging under the keel: keel oblong, bifid, spreading, blunt, bent down from the pistil, and gaping from the banner: the stamina have diadelphous filaments, united almost to the tops: anthers small: the pistillum is a pedicelled oblong germ, curved in, compressed, involved in the filaments, starting from the keel, bending back the banner, ending in a short, awl-shaped, almost straight style: stigma terminating, very small: the pericarpium is a compressed legume, long, bent in: the seeds several, kidney-shaped or angular.

The species cultivated are: 1. *M. arborea*, Tree Medick, or Moon Trefoil; 2. *M. polymorpha*, Variable Medick, or Snail and Hedge-hog Trefoil.

The first is a shrub growing to the height of from four or five to eight or ten feet, and being covered with a gray bark, the whole has a hoary appearance: the stem divides into many branches, with ternate leaves at each joint, on foot-stalks about an inch in length: there being several of these leaves together, the whole shrub is closely covered with them; and it is never destitute of leaves: the component leaflets are small, lanceolate, (or wedge-shaped, emarginate,) and hoary on their under side: the flowers are produced on peduncles from the side of the branches, four or five together, and are of a bright yellow: the pods contain three or four small seeds. It flowers a great part of the year, and when sheltered is seldom destitute of them; beginning in the open air to flower in April, and continuing till December.

It grows in great plenty in Abruzzo, and Naples.

The second species has an annual, oblong, branched root; the stems more or less procum-

bent, somewhat angular, hoary, from a hand to a foot in length, ternate: leaflets roundish, retuse, subserrate, glaucous-green, petioled: the upper ones smaller, soft, tomentose: the stipules entire or toothed, sessile, in pairs at the base of the petioles: the peduncles axillary, much longer than the leaves, round, pubescent, forming a spike: flowers very small, commonly yellow: the calyx smaller than the corolla, hirsute, green-hoary: the legumes shell-snailed, small, one-celled, of different shades of brown or blackish when ripe, ciliate, aculeate or naked: the seeds ovate, smooth, convex on one side, flat on the other, lemon-coloured. It is a native of the South of Europe.

There are numerous varieties and subvarieties, but the principal are: the Common Snail Medicago, with large smooth pods, shaped and twisted like a snail: the Hedge-hog Medicago, with large prickly snail-shaped pods, armed with spines pointing every way like a hedge-hog; with turbinated pods; with globular pods; with orbicular pods; with long crooked pods; with double pods; with clustered pods; with twisted pods; and with jagged leaves.

Culture.—The first sort may be raised from seeds or cuttings.

The seeds should be sown in the early spring, on a warm border, or in pots of light mould, and plunged in a moderate hot-bed, till the plants have attained a little growth; when they should be gradually hardened to the full air. In both methods the plants should be kept clean, and have protection in the following winter from frost, and in the spring they should be planted out, some into pots to have the management of green-house plants, and others into the borders and nursery-rows, in dry warm situations, the former to remain, and the latter to be occasionally transplanted.

When they are increased by cuttings, they should be planted on a bed of light rich earth, or in pots of the same sort of mould, and plunged in a moderate hot-bed, due shade and water being given; and when they have formed good roots, in the autumn they may be removed into other pots or the situations in which they are to remain, shading and watering them till they are well rooted, when they should be trained up to sticks, to have straight stems and regular heads, their irregular shoots being annually pruned to keep them in order. These plants are found to grow stronger and flower better when kept in warm situations in the open air, than when managed as green-house plants. They should, however, be sheltered in very severe winters.

The second sort and varieties may be raised from seed, which should be sown in the early spring months in the places where the plants are to remain, in patches of several seeds, afterwards thinning the plants to two or three of the best, when they require no further culture. It is the double sorts that are chiefly cultivated in the garden.

They both afford variety in the borders and other parts, and the former in the green-house.

MEDLAR. See MESPILUS.

MEDUSA'S HEAD. See EUPHORBIA.

MELASTOMA, a genus containing plants of the evergreen tree and shrub exotic kinds.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Calycanthemæ*.

The characters are: that the calyx is a one-leafed, bell-shaped perianthium, ventricose at the base, four or five-cleft, permanent: the corolla has four or five roundish petals, inserted into the throat of the calyx: the stamina have eight or ten filaments, inserted into the calyx, short: anthers long, somewhat curved, upright, one-celled, gaping at top with an oblique hole: scalelets two, very small, diverging, annexed to each filament below the anther, the rudiment of another cell: the pistillum is a roundish germ, in the belly of the calyx: style filiform, straight: stigma blunt or headed: the pericarpium is a two-, three-, four-, or five-celled berry, wrapped up in the calyx, roundish, crowned with a cylindric rim: the seeds very many and nestling.

The species cultivated are: 1. *M. grossulariodes*, American Gooseberry of Surinam; 2. *M. holosericea*, Satiny-leaved Melastoma of Brazil.

Other species may be cultivated for variety.

The first seldom grows more than seven or eight feet high, spreading out into many slender branches, covered with a smooth purple bark: the leaves are lanceolate, five inches long, and two broad in the middle, smooth on both sides, entire, acute-pointed: the flowers are produced in pretty long hanging bunches, of an herbaceous colour, with styles stretched out a good length beyond the petals, and permanent: the fruit small and black when ripe. It is a native of Surinam.

The second species has a shrubby stem, rough-haired, with membranaceous corners: the leaves cordate at the base, acuminate, whitish underneath, nine-nerved, with three nerves thicker: the racemes opposite, subdivided, with a sessile flower in the forkings: the last pedicels three-flowered: the corollas rather large: the calyx oblong, five-cleft; segments lanceolate,

acute: the petals five, obovate, roundish, blunt, spreading, longer than the segments of the calyx, violet-purple: the filaments ten, the length of the corolla, filiform, purple: the anthers very long, sickle-shaped: the germ oblong: the style long and curved: the stigma thickish: the fruit a berry. It is a native of Brazil.

Culture.—These plants are best obtained by having the entire fruits put up in their native places in dry sand as soon as ripened and immediately forwarded, which as soon as they arrive should be taken out, and the seeds sown in pots of light earth, plunging them in a moderate hot-bed of tanner's bark: when the plants are up, and fit to remove, they should be planted each in a small pot of light earth, re-plunging them into the tan-bed.

They afterwards require the management of other woody stove plants.

They may also be increased by laying the young branches in the spring and by planting cuttings of the young shoots in the summer season in pots, and plunging them in a hot-bed. They must afterwards have the same culture as the others.

MELIA, a genus containing plants of the deciduous and evergreen exotic tree kinds.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Trihilatæ*.

The characters are: that the calyx is a one-leafed perianthium, very small, five-toothed, upright, blunt: the corolla has five linear-lanceolate petals, spreading, long: nectary cylindric, one-leafed, the length of the corolla, with a ten-toothed mouth: the stamina have ten filaments, very small, inserted within the apex of the nectary: anthers not exceeding the nectary, oblong: the pistillum is a conical germ: style cylindric, the length of the nectary: stigma capitate, with five converging valves: the pericarpium is a globular soft drupe: the seed a roundish nut, five-grooved, five-celled.

The species are: 1. *M. Azedarach*, Common Bead-tree: 2. *M. sempervirens*, Evergreen Bead-tree; 3. *M. Azedirachta*, Indian Evergreen Bead-tree.

The first, in its native situation, grows to a large tree, spreading out into many branches: the leaflets are notched and indented on their edges, deep green above, and paler underneath: the flowers come out from the side of the branches in long loose bunches: the petals are blue: the fruit oblong, the size of a small cherry, green at first, but when ripe changing to a pale yellow: the nut four- or five-celled, with one oblong seed in each cell. It flowers in July, but seldom produces seeds: it drops the leaves in autumn, and puts out fresh ones in the spring: the pulp surrounding the nut is said to be poisonous. The nuts are bored and strung for beads. It is a native of Syria.

The second species, which has generally been regarded as a variety, is thought by Swartz to be a distinct species, differing from that in being smaller and often flowering for two years together: the leaflets, which are bright green, are seldom more than seven, wrinkled a little, deeper and more unequally serrate and acuminate. It is a native of the East Indies.

The third becomes a large tree in India. The stem is thick, the wood of a pale yellow, and the bark of a dark purple colour, and very bitter: the branches extend wide on every side: the leaves are composed of five or six pairs of oblong acute-pointed leaflets, terminated by an odd one; they are serrate, of a light green colour, and of a strong disagreeable odour; they stand upon pretty long foot-stalks, opposite, or alternate: the flowers are produced in long branching panicles from the side of the branches: they are small, white, and sit in small calyxes, cut into five acute segments: fruit oval, the size of small olives, green, turning yellow, and when ripe changing to purple: the pulp is oily, acrid, and bitter: the nut is white, and shaped like that of the former.

Culture.—These plants are all capable of being increased by seeds, which in the first sort are obtained from abroad, and should be sown in pots of light rich earth in the spring, plunging them in a hot-bed of tanner's bark or dung, under frame and glasses, giving frequent waterings and fresh air when the plants are come up, being fully exposed in a moderate shade, during the summer, and placed under a frame in the autumn, &c. to have the free air all winter in open weather, and be sheltered from frost.

In the following March they may be planted in separate small pots, plunged in a bark-bed, &c. Though this last is not absolutely necessary, when practised it greatly facilitates their rooting and early growth.

When they have been thus managed for three or four years, and shifted occasionally into larger pots; some of the strongest and most woody plants may be planted out in the full ground under a warm wall, or in a dry sheltered part of the shrubbery. The proper season for this work is the first fortnight in April.

Some plants should likewise be placed in pots, to have the management of green-house exotic plants, lest those in the open ground

should be destroyed by the frost during the winter season.

In the second and third sorts, the seeds should be sown in pots and plunged in the bark-bed, and managed nearly as the first sort; but, as being much more tender, must be always kept in pots, and plunged in the tan-bed in the stove during their early growth; afterwards, when they have acquired considerable size and strength, they may be placed in the open air for a month or two in the heat of summer, but the rest of the year be kept in the hot-house: managing them as other woody exotic stove plants.

The last sort is not common in the gardens.

The first sort is proper for shrubberies and other parts in warm situations as well as for the green-house, and the others for stove collections.

MELIANTHUS, a genus containing plants of the perennial exotic kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Corydales*.

The characters are: that the calyx is a large perianthium, five-parted, coloured, unequal: the two upper segments oblong, erect; the lowest very short, like a bag, gibbous downwards; the middle segments opposite interior, lanceolate, the uppermost simple, erect: the corolla has four petals, lanceolate-linear, with the tops reflex, from parallel spreading, turned outwards, forming the lower lip, as the calyx itself does the upper, connected at the sides in the middle: nectary one-leafed, placed within the lowest segment of the calyx, and fastened to it with the receptacle, very short, compressed at the sides, gashed at the edge, turned downwards by the back: the stamina have four awl-shaped filaments, upright, the length of the calyx; the two lower shorter, united at the base: anthers cordate-oblong, four-celled in front: the pistillum is a four-cornered germ, gibbous, four-toothed: style upright awl-shaped, of the same length, and in the same situation with the stamens: stigma four-cleft, with the upper segment larger: the pericarpium is a quadrangular capsule, half-four-cleft, angles sharp, distant: cells inflated: partitions open in the centre for a receptacle of the seeds, gaping between the angles: the seeds in fours, subglobular, annexed to the centre of the capsule.

The species cultivated are: 1. *M. major*, Great Honey-flower; 2. *M. minor*, Small Honey-flower.

The first has a woody, perennial, spreading root: the stems many, woody, four or five feet high, herbaceous towards the top: the leaves large, embracing the stem at the base, where they have a large single stipule fastened on the upper side of the foot-stalk, with two ears at the base, which also embrace the stem: the leaves have four or five pairs of very large leaflets, deeply jagged into acute segments; and between them runs a leafy jagged border or wing along the upper side of the midrib, so as to connect the leaflets at the base; they are of a gray colour: the spikes are pretty long, springing from between the leaves towards the top of the stalks: the corolla is brown or chocolate colour. It has been remarked by Linnæus, that when shaken while in flower it distils a shower of nectar. It is a native of the Cape.

The second species rises with round, soft, woody stalks; five or six feet high, sending out two or three branches from the sides: the leaves are not half so large as those of the preceding, deep green on the upper, and whitish on the under side: the flowers come out from the side of the stalks in loose hanging panicles, each sustaining six or eight flowers, smaller than those of the first sort: the lower part of the petals is green, the upper saffron-coloured, and on the outside, in the swelling part of the petals, is a blush of fine red. Mr. Curtis remarks, that the stem, which is shrubby, during the flowering season is apt to exhibit a naked appearance, having then fewer leaves on it, and those not of their full size: that the foliage has an unpleasant smell; and that the nectar does not flow so copiously as in the large sort, but is retained at the bottom of the corolla, and is of a dark brown colour. It is a native of the Cape.

Culture.—These plants may be increased by suckers from the roots and cuttings of the young stalks or branches.

The first sort is best raised by planting the suckers or side-shoots, any time in the spring or summer seasons, choosing such as are furnished with root fibres, in pots, or the places where they are to remain, which, after they are planted and have taken root, require little further care but to keep them clean from weeds. The cuttings may be planted during any of the summer months, due water and shade being given. When they have taken root they should be planted out where they are to remain, or in separate pots, to be managed as green-house plants.

The second sort is raised with more difficulty, and chiefly from cuttings, which should be planted upon an old hot-bed, the heat of which is over, and covered close with bell- or hand-glasses to exclude the air. When they have

taken root they may be planted out in pots and sheltered in the winter under a frame for a year or two till they are become strong, after which they may be set out in a warm border, and be managed in the same manner as the first sort.

They succeed best in a dry soil and warm situation; but some plants should always be kept in pots and treated as green-house plants, lest those in the open ground be destroyed by severe frosts.

They afford ornament and variety in the borders and clumps, as well as among other plants in the green-house.

MELISSA, a genus containing plants of the hardy herbaceous, fibrous-rooted perennial kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ*.

The charaters are: that the calyx is a one-leaved perianthium, subcampanulate, dry-scariose, spreading a little, angular, striated, permanent, with a two-lipped mouth: upper lip three-toothed, reflex-spreading, flat; lower lip shorter, sharpish, two-parted: the corolla one-petalled, ringent: tube cylindrical: throat gaping: upper lip shorter, erect, arched, roundish, bifid: lower lip trifid: middle segment larger, cordate: the stamina have four awl-shaped filaments; two the length of the corolla, two shorter by half: anthers small, converging in pairs: the pistillum is a four-cleft germ: style filiform, the length of the corolla, inclining along with the stamens beneath the upper lip of the corolla: stigma slender, bifid, reflex: there is no pericarpium: calyx larger, unchanged, fostering the seeds in its bosom: the seeds four, ovate.

The species cultivated are: 1. *M. officinalis*, Officinal or common garden Baum or Balm; 2. *M. grandiflora*, Great-flowered Baum; 3. *M. Cretica*, Cretan Baum; 4. *M. fruticosa*, Shrubby Baum.

The first has a perennial root, and an annual stalk, which is square, branching, from two to three feet high: the leaves by pairs at each joint, two inches and a half long, and almost two inches broad at the base, growing narrower towards the top, indented about the edges; the lower ones upon pretty long foot-stalks; flowers grow in loose small bunches from the axils in whorls, upon single peduncles: they are white, or yellowish, and appear in July. It is a native of the southern parts of Europe.

It varies, with variegated leaves, and with the stalks slender, the leaves much shorter, the whole plant hairy, and of a strong disagreeable odour: the flowers in whorls, sitting pretty close to the branches, and smaller than those of the common sort. This is the Roman Baum.

The second species has a perennial root and an annual stalk, rising about a foot high: the leaves in pairs at each joint, an inch and a half long, and three quarters of an inch broad, serrate, of a lucid green on the upper side, and whitish on the under: single peduncles come out from the axils, half an inch long, and dividing into two smaller ones, each sustaining two flowers upon short separate pedicels: the flowers are large, of a purple colour. It flowers in June, ripening seeds in August, and is a native of Tuscany, &c.

There are varieties with white flowers; with red flowers; and with variegated leaves. They are all inferior to the purple.

The third has slender stems, low, straight, a little woody, and dark purple: the leaves are small, roundish, hoary: the flowers small and white, appearing in June; the seeds ripen in autumn. It seldom continues more than two or three years, and is a native of the South of Europe.

The fourth has also slender shrubby stems, about nine inches long, putting out small, opposite side-branches: the leaves small, hoary, ovate-acuminate: the flowers are in whorled spikes at the end of the stalks: they are small and white or pale purple, appearing in July, and ripening seeds in autumn. The whole plant has a strong scent of pennyroyal, and is of short continuance.

Culture.—The first and second sorts may be readily increased by parting the roots and planting them out in the early autumn, as October, time enough for the offsets to be established before the winter frosts come on. They should be divided into small pieces with three or four buds to each, and the first sort planted two feet a-part in beds of common garden earth, and the second sort in the borders or other parts singly, in larger offset slips. The only culture they afterwards require is to keep them clean from weeds, and to cut off the decayed stalks annually in autumn, digging or stirring the ground between the plants in the common sort.

The third sort may be raised by sowing the seeds in the autumn or spring, or where the seeds are permitted to scatter there will be a sufficient supply of young plants.

The fourth species may also be increased by seeds sown in the spring on beds or in pots, or by cuttings planted in the same manner, in any of the summer months, and shaded from the sun.

They frequently live through the winter in warm borders; but it is always proper to keep a plant or two in pots, sheltered under a frame during that season.

The first sort is useful for various domestic purposes, and the others ornamental in the borders, clumps, and other parts, as well as affording variety among potted plants.

MELITTIS, a genus containing a plant of the flowery perennial kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leafed perianthium, bell-shaped, round, straight, with a two-lipped mouth: upper lip higher, emarginate, acute; lower shorter, bifid, acute, with the divisions gaping: the corolla one-petalled, ringent: tube much narrower than the calyx: opening scarcely thicker than the tube: upper lip erect, roundish, entire: lower spreading, trifid, blunt; middle segment larger, flat, entire: the stamina have four filaments, awl-shaped, under the upper lip, the middle ones shorter than the two outer: anthers converging by pairs in form of a cross, bifid, blunt: the pistillum is a blunt germ, four-cleft, villose: style filiform, the length and situation of the stamens: stigma bifid, acute: there is no pericarpium: calyx unchanged, containing the seeds at the bottom: the seeds four.

The species cultivated is: *M. Melissophyllum*, Bastard Baum.

It has a perennial root, sending up in the spring three, four, or more stems, a foot and a half high or more, upright, with a few branches at the base: the whole plant is hairy: the leaves opposite, petioled, ovate, elliptic, or ovate-lanceolate, somewhat pointed, unevenly and bluntly serrate, the serratures terminating in purplish glands, slightly villose, wrinkled: petioles channelled above, hirsute, united at the base; the flowers large, handsome, growing chiefly on one side, in half whorls, about six flowers together, of a purplish white colour. It is a native of several parts of Europe, flowering in May or June.

Much honey is secreted from a gland that encircles the base of the germ; it is a favourite plant with bees.

There is a variety smaller in all respects, with the leaves ovate and heart-shaped, the flowers not so large, and usually of a pale red, but sometimes white, which is a native of Switzerland, &c.

Culture.—These plants are capable of being increased by parting the roots and planting them out early in the autumn where they are to remain. The roots should not be parted oftener than every third year. When seeds can be procured, they may also be raised by sowing them in the early spring, where they are to remain. The plants succeed best in a loamy soil and eastern aspect.

They afford ornament in the borders and other parts of pleasure-grounds.

MELON. See CUCUMIS.

MELON-GROUND, the space or portion of ground in the kitchen-garden, or other place, appropriated to the culture of Melons and other vegetables that require artificial heat. See GARDEN, and MELONARY.

MELONARY, the portion of ground in the kitchen-garden principally allotted for the business of early and general hot-bed work, in the culture of Melons and Cucumbers as well as occasionally in other framing culture.

These places are mostly inclosed by some sort of fence, and are particularly convenient and useful, as in the practice of hot-bed culture there is unavoidably a considerable littering occasioned at times, by means of the necessary supplies of hot-dung, straw, litter, and other materials, both in the making of the beds and after-culture; which by this means being confined to a particular part, the whole is performed more conveniently, and without incommoding the œconomy of the other parts of the garden.

They are also very useful when properly chosen in the driest and warmest situations, in the advantage of having the hot-beds on dry ground, and sheltered from cutting winds, with the full benefit of the whole day's sun, as well as in being more secure.

In considerable gardens, the places allotted for this use are sometimes of such extent, as to have the hot-houses, or forcing-houses, and other appurtenances of that kind, where culture by artificial heat is required, near together, by which time and trouble is saved.

In the choice of a place for this purpose, some part of the warmest, best-sheltered, dry quarter of the garden, which is well defended from the northerly and north-easterly winds, and where the ground is dry at all seasons, not liable to inundation or the stagnation of water, and conveniently situated for bringing in dung, tan, earth, &c., should be fixed upon.

And if, with these advantages, it lies rather a little higher or very gently sloping towards some lower part, it will be more proper, especially when towards the full sun from rising to setting, so as to admit of ranging the hot-beds longitudinally east and west, or as nearly in that direction as possible. See GARDEN.

The extent or dimensions must be according to

the quantity of hot-bed framing required, as from two or three, to ten, twenty, or thirty frames, or more; and sometimes also for hot-bed ridges for hand-glasses in the same proportions. They may of course be from two or three to five or ten rods square, or to that of a quarter, or half an acre, or more; in which, besides the part immediately allotted for the hot-beds, it is convenient to have room for the previous preparation of the dung, &c. as well as for compost, heaps of earth, &c. in preparation for earthing the hot-beds.

In respect to form, the most eligible shape is that of square, either an equal or an oblong square.

When inclosed, the fences may be six, seven, or eight feet high in the northerly or back part and five or six in front, the sides corresponding, though when extensive they may be nearly of equal height all round.

The internal part, or immediate place for the hot-beds, even when dry, should be a little elevated to throw off the falling wet of heavy rain, &c.; and when unavoidably low, or liable to be wet in winter or spring, be raised, with some dry materials, considerably above the general level, that the hot-beds may stand dry, as well as to afford advantage in performing the business of culture.

The ground for the immediate place of the hot-beds may generally remain even or level: some however form shallow trenches, the width and length of the intended hot-beds, as from six to twelve inches deep, and make the lower part of the bed in the trench; which, however, is more proper in a dry or somewhat elevated situation than in low or wet ground, as water is apt to settle in the bottom, and chill the beds, occasioning the heat to decline suddenly.

Besides, by having the hot-beds wholly aboveground, there is a better opportunity of applying the occasional linings quite from the bottom upwards. See GARDEN, and CUCUMIS.

By proper attention in the construction of the different parts of these grounds and in the building of the fences, they may also be rendered highly useful in raising various kinds of fruit.

MELON-THISTLE. See CACTUS.

MELOPEPO. See CUCURBITA.

MENISPERMUM, a genus containing plants of the hardy climbing kind.

It belongs to the class and order *Dioecia Dodecandria*, and ranks in the natural order of *Sarmentaceæ*.

The characters are: that the male has the calyx a two-leaved perianthium: leaflets linear, short: the corolla petals outer six, ovate, spreading, equal, inner eight, obcordate, concave, smaller than the outer, four of them in the inner row wider: the stamina have sixteen filaments, cylindric, a little longer than the corolla: anthers terminating, very short, bluntly four-lobed: female; calyx and corolla as in the male: the stamina have eight filaments, like those of the male: anthers pellucid, barren: the pistillum has two or three germs, ovate, curved inwards, converging, pedicelled: styles solitary, very short, recurved: stigmas bifid, blunt: the pericarpium has two or three berries, roundish-kidney-form, one-celled: the seeds solitary, kidney-form, large.

The species cultivated are: 1. *M. Canadense*, Canadian Moon-seed; 2. *M. Virginicum*, Virginian Moon-seed; 3. *M. Carolinum*, Carolina Moon-seed.

The first has a thick woody root: the stems many, climbing, becoming woody, and rising to the height of twelve or fourteen feet, twisting themselves about the neighbouring plants for support: the leaves are large, smooth, with the footstalk almost in the middle, and a hollow there on the upper side: the flowers come out in loose bunches from the side of the stem: they are of an herbaceous colour, small, and composed of two rows of oblong oval petals: the stem twines in a direction contrary to the sun's apparent motion, and is smooth and even. It is a native of Canada, &c., flowering in June and July.

The second species differs from the first in the shape of the leaves, which are angular and sometimes heart-shaped, but not peltate, having the footstalk at the base: the stems become woody, and rise nearly as high as those of the first sort: they are round, slender, twining: the leaves are alternate, bright green, the form, colour and consistence of Ivy-leaves, on the upper part of the stem entire, as on old Ivy; on the middle and lower part not unfrequently angular, as in young Ivy; although they have very slender hairs on them, yet they have the appearance of being smooth and shining, especially the younger leaves, for the older ones are subhirsute and less shining; underneath they are of a paler green. The flowers and berries differ little from the first sort. It is a native of Virginia, &c.

The third differs from the second sort in its branches not becoming woody as in that: the stems are herbaceous, the leaves entire and hairy, and not more than half so large; nor is the plant so hardy, so that it does not produce flowers in this climate, unless the season be very warm. It is a native of Carolina.

Culture.—The first and second sorts are easily propagated by laying down the branches in the autumn season, and when the layers have made good roots, in the following autumn they may

be separated and planted out where they are to remain. As their branches are weak and slender, they require support; and when planted near trees thrive better than in an open situation.

The third sort may be increased by parting the roots, and planting them out in the spring, a little before the plants begin to shoot, in warm situations where the soil is light, as in strong retentive land the roots are apt to rot. When planted close to a wall exposed to the south or west, their stalks may be fastened against the wall, to prevent their trailing upon the ground; in which situations the plants frequently flower. They should have a little shelter in severe frost in order to preserve their stalks.

They afford ornament and variety as climbers in the shrubberies and other parts.

MENTHA, a genus containing plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ* or *Labiatæ*.

The characters are: that the calyx is a one-leafed, tubular perianthium, upright, five-toothed, equal, permanent: the corolla one-petalled: petals upright, tubular, a little longer than the calyx: border four-parted, almost equal; the upper segment wider, emarginate: the stamina have four filaments, awl-shaped, upright, distant, the two nearest longer: anthers roundish: the pistillum is a four-cleft germ: style filiform, upright, longer than the corolla: stigma bifid, spreading: there is no pericarpium: calyx upright, with the seeds in the bottom: the seeds four and small.

The species cultivated are: 1. *M. viridis*, Spear Mint; 2. *M. rotundifolia*, Round-leaved Mint: 3. *M. crispa*, Curled Mint; 4. *M. piperita*, Pepper-Mint; 5. *M. gentilis*, Red Mint; 6. *M. Pulegium*, Pennyroyal; 7. *M. cervina*, Hyssop-leaved Mint, or Upright Pennyroyal.

The first has long, creeping, very spreading roots; the stalks are upright, square, single, green, rising two or three feet in height: leaves spear-shaped, serrated, close-sitting, smooth, very green: the stalks are terminated by purplish flowers, in oblong erect spikes: the stamina longer than the corolla, the latter of which is purplish red. It is a native of Britain, &c.

As it is not so hot to the taste as Peppermint, and having a more agreeable flavour than most of the other sorts, it is generally preferred for culinary and other purposes. The leaves and tops are used in spring salads, and eaten as sauce with lamb, and, when dried, in soups, &c.

There are several varieties: as broad-leafed; narrow-leafed; curled-leafed; variegated-leafed; silver-striped-leafed; gold-striped-leafed.

The second species has the stems from two to three feet in height, erect, hairy or shaggy, the hairs pointing more or less downwards: the leaves are somewhat cordate, rugged, strongly and sharply crenate or rather serrate, the teeth and points of the small upper ones being often very taper: the under side is shaggy not hoary, and all the veins are fringed as it were with close hairs: the spikes are several, terminating erect, sharpish, not very densely whorled: th bractes lanceolate, hairy, sharp and projecting: the flowers reddish: the calycine teeth broad at the base; the stamens always much longer than the corolla. It is a native of several parts of Europe, flowering in August and September. It it found in gardens variegated.

The third has the stems hairy, much branched, about the same height with common Spear Mint: the leaves deeply indented on their edges, waved and curled, light green: the flowers purple, growing in thick interrupted spikes at the top of the stalks: the calyx cut almost to the bottom: the style standing out beyond the corolla. It is a native of Denmark, or Siberia.

The fourth species has smooth purple stalks: the leaves are smaller than those of Spear Mint; they are lanceolate, serrate, very dark green, with purple midrib and veins, and they are a little hairy on their under side: the spikes of flowers are shorter and thicker than those of Spear Mint, and are broken or interrupted at bottom, the lower whorls peduncled, distant, consisting of from nine to twelve: the corolla is of a dark purple colour, and the stamens are longer than the corolla.

In external appearance it corresponds with the first sort, for which it may easily be mistaken; but in that the stem is taller, the leaves have scarcely any petioles, and are narrower in proportion to their length, the spikes are longer and composed of more whorls. It is a native of Britain, flowering in August.

The fifth has several erect stems, growing in tufts, about eighteen inches high, with harsh somewhat hairy angles, more or less reddish in the upper part, branched, leafy: the leaves most crowded towards the upper part, sharply serrate, veiny, punctuated with shining dots, having a few short hairs scattered over them, especially about the margin, and along the nerves on the back: their usual scent is much like that of the first sort, but the smell of Mints is very variable. It is a native of several parts of Europe.

There is a variety with the scent of Basil; Orange scented Mint; Gold striped orange Mint; Yellow orange Mint; and Reddish orange Mint.

The sixth species has a fibrous perennial root: the stems smooth, and putting out roots at every joint: the leaves for the most part entire: the flowers towards the upper part of the branches, just above the leaves at each joint, in whorls: the corolla small, pale purple; upper lip entire: the stamens of the same length with the corolla, but the style somewhat longer. It is a native of many parts of Europe, flowering in August and September.

It varies with a white flower, and with the stems erect, nearly a foot high: the leaves longer and narrower: the whorls of flowers much larger: the stamens longer than the corolla: this is Spanish Pennyroyal, which has almost superseded the other sort; the stems being more erect, it is easier to tie in bunches, and it comes earlier to flower, and has a brighter appearance.

The seventh has also erect stems, nearly two feet high, sending out side branches all their length: the leaves are very narrow, and of a thicker substance than those of common Pennyroyal: the whorls of flowers are rather larger, and the stalks are frequently terminated by them: the scent is not quite so strong as that of the sixth sort. It flowers about the same time, and is a native of the South of France and Italy.

There is a variety with white flowers, growing taller than the common one with purple flowers, which is by some preferred to the sixth sort for medicinal use, and called Hart's Pennyroyal.

Culture in the mint kind.—These plants may all be increased with facility by young offset plants or shoots, or by parting their roots, and planting them out in the spring, or by planting cuttings during any of the summer months in a moist soil. After the cuttings are planted, when the season is dry, they should be often watered until they have taken root; when they require no further care, but to be kept clean from weeds. The best method is to plant them in beds about four feet wide, allowing a path about two feet broad between them, to water, weed, and cut the plants; being set four or five inches or more distant in the rows, as the plants spread much at their roots; on which account the beds should not stand longer than three years before planting them again, as by that time the roots become so closely matted, as to rot and decay each other when they stand longer.

The general culture is that of clearing them from weeds in spring and summer, cutting down all the remaining stalks annually in autumn; clearing them of all weeds; digging the alleys, and spreading a little of the earth over the beds.

Plantations thus formed will afford several cuttings every summer, when only wanted young for use, for culinary purposes; but when for drying to keep in winter, or green for distilling or medicinal use, the plants should generally be suffered to stand until nearly full grown, and they are just coming into flower; which being then cut down close, the roots send up another crop fit for cutting again in the beginning of autumn, or towards Michaelmas; each general cutting being always made as close to the ground as possible.

Forcing Mint on hot-beds.—When it is much wanted for salads in the winter and early spring seasons, a hot-bed should be made for this purpose, any time after November till the spring, about two feet thick of dung, covering it with garden-frames and glasses, or with mats, on arched sticks, which should then be earthed over with rich mould, six inches thick; when a quantity of the roots should be taken up from a bed and planted pretty close together upon the surface of the bed, moulding them over an inch deep with fine earth, putting on the lights, or other coverings, keeping them close in the nights and in bad weather, but admitting fresh air in mild weather. The plants soon come up, when continue to admit fresh air in fine weather, and give moderate waterings, and they will soon be ready to have their young green tops gathered for use.

When the plants are two or three inches high, they are ready for being cropped, after which they readily break out again, and fresh shoots rise from the bottom; so that the same bed furnishes fresh supplies a long time; two beds, made at different times, being generally sufficient for the whole winter use.

In this way Mint may be obtained young and green from the time that in the natural ground goes off in autumn until it comes in again in the spring season.

It may also be procured by planting some roots thick in large pots, and placing them in a hot-house, as they quickly shoot and furnish plants of young green Mint.

Where this practice is much attended to, small fresh plantations should be made annually in the open ground for the purpose of furnishing a sufficiency of roots, proper for taking up at forcing time, without disturbing those of the principal crops.

Culture in the Pennyroyal kinds.—These may

be increased in the same manner as above, and also by their creeping stems, which should be cut off and planted out in fresh beds, allowing at least a foot distance every way. The young shoots planted in the spring in the same way also take root like the other sorts.

The proper time for this work is in the early autumn, that the plants may be well rooted before winter.

In this way the plants are much stronger and produce larger crops than when planted out in the spring. When the roots remain so close as is generally the case, they are apt to rot in the winter season. They succeed best in a moist strong soil.

Some of the species and varieties may be introduced in the borders and other parts of pleasure-grounds, for ornament and variety.

MESEMBRYANTHEMUM, a genus containing plants of the succulent flowery exotic kinds.

It belongs to the class and order *Icosandria Pentagynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is a one-leafed perianthium, five-cleft, superior, acute, spreading, permanent: the corolla is one-petalled: petals lanceolate-linear, very numerous, in several rows, a little longer than the calyx, slightly united at the claws into one: the stamina have numerous capillary filaments, the length of the calyx: anthers incumbent: the pistillum is an inferior germ, with five blunt angles: styles commonly five, awl-shaped, upright, and then bent back: stigmas simple: the pericarpium is a fleshy capsule, roundish, the navel marked with rays; the cells corresponding with the styles in number: the seeds very many and roundish.

The species cultivated are: 1. *M. crystallinum*, Diamond Fig Marigold, or Ice Plant; 2. *M. pinnatifidum*, Pinnated Fig Marigold; 3. *M. Tripolium*, Plane-leaved Fig Marigold; 4. *M. caducum*, Small-flowered Fig Marigold; 5. *M. pupulosum*, Angular-stalked Fig Marigold; 6. *M. geniculiflorum*, Jointed Fig Marigold; 7. *M. noctiflorum*, Night-flowering Fig Marigold; 8. *M. splendens*, Shining Fig Marigold; 9. *M. umbellatum*, Umbelled Fig Marigold; 10. *M. expansum*, Houseleek-leaved Fig Marigold; 11. *M. calamiforme*, Quill-leaved Fig Marigold; 12. *M. bellidiflorum*, Daisy-flowered Fig Marigold; 13. *M. deltoides*, Delta-leaved Fig Marigold; 14. *M. barbatum*, Bearded Fig Marigold; 15. *M. hispidum*, Bristly Fig Marigold; 16. *M. villosum*, Hairy-stalked Fig Marigold; 17. *M. scabrum*, Rugged Fig Marigold; 18. *M. reptans*, Creeping Fig Marigold; 19. *M. uncinatum*, Hook-leaved Fig Marigold; 20. *M. spinosum*, Thorny Fig Marigold; 21. *M. tuberosum*, Tuberous-rooted Fig Marigold; 22. *M. tenuifolium*, Slender-leaved Fig Marigold; 23. *M. stipulaceum*, Upright-shrubby Fig Marigold; 24. *M. crassifolium*, Thick-leaved Fig Marigold; 25. *M. falcatum*, Sickle-leaved Fig Marigold; 26. *M. glomeratum*, Clustered Fig Marigold; 27. *M. bicolorum*, Two-coloured Fig Marigold; 28. *M. serratum*, Serrate-leaved Fig Marigold; 29. *M. micans*, Glittering Fig Marigold; 30. *M. veruculatum*, Spit-leaved Fig Marigold; 31. *M. glaucum*, Glaucous-leaved Fig Marigold; 32. *M. corniculatum*, Horned Fig Marigold; 33. *M. ringens*, Ringent Fig Marigold; 34. *M. dolabriforme*, Hatchet-leaved Fig Marigold; 35. *M. difforme*, Various-leaved Fig Marigold; 36. *M. albidum*, White Fig Marigold; 37. *M. linguiforme*, Tongue-leaved Fig Marigold; 38. *M. pugioniforme*, Dagger-leaved Fig Marigold; 39. *M. tortuosum*, Twisted-leaved Fig Marigold; 40. *M. emarginatum*, Notch-flowered Fig Marigold; 41. *M. bracteatum*, Bracteated Fig Marigold.

There are other species that may be cultivated.

The first is an annual plant, distinguished by its leaves and stalks being closely covered with pellucid pimples full of moisture, which when the sun shines on them reflect the light, and appear like small bubbles of ice, whence it is called the Ice Plant: others name it the Diamond Plant, or Diamond Ficoides. The stem has opposite and alternate cylindrical branches, which, when luxuriant, trail upon the ground, and are from one to two feet long. The first four or six leaves are opposite, each pair crossing the other, very lax and succulent, waved, blunt, attenuated or wedge-shaped at the base, and connate, rather keeled underneath, especially at the base, with a slight corresponding channel along the centre of the upper surface, which is covered with less and duller pimples than any other part of the plant: the margin is regularly edged, with globular papulæ or pimples, which are less than those on the stems: the upper leaves are alternate, growing less and less, nearly sessile, small: the peduncles extremely short or none, alternate, from the axils of the upper leaves: the segments of the calyx unequal, three of them large and leafy, beset with pilescent pimples, and acutely pointed; the two inner much smaller, frequently coloured with a purplish tinge, acute at the points: the petals very narrow, blush-coloured without, whitish within, sometimes entirely white. It is a native of Greece, flowering in July and August.

The second species is an annual root, not much branched, of short duration: the whole plant is sprinkled over with glittering particles, like the Ice-plant, to which it bears some affinity in its duration: the stems are branching, of a bright red colour, trailing: the leaves yellowish-green, opposite, attenuated at the base: the flowers small, axillary, solitary, on longish peduncles, yellow: the calycine segments unequal, three being short, two longer and broader: the petals numerous, scarcely equal to the longest segments of the calyx, linear, expanding in the afternoon: the filaments numerous, yellow: the anthers yellow: the germ roundish: capsule obtuse-angled, obtruncate: the seeds numerous, small, roundish, and brown. Introduced from the Cape, flowering in July and August.

The third species has a biennial root: the stems are prostrate, smooth, finally terminating in flowers: the lower leaves many, almost as long as the stems, resembling those of Aster Tripolium, but thicker and more succulent: among these spring three or four stems, sometimes more round, and having two or three joints, at each of which are two smaller leaves at the lower, and three or four at the upper joints: the surface in all smooth and even, and very minute white teeth about the edge, more perceptible in the smaller leaves, and the lower part of the others: the flowers are usually solitary, silvery white, opening in the middle of the day, and of short duration. It is a native of the Cape, flowering from June to September.

The fourth is a biennial plant. A native of the Cape, flowering in July and August.

The fifth species has a biennial root: the stem is short, nearly the thickness of the little finger: the branches are opposite, spreading very much, obscurely angular, or round, herbaceous, green, the lower ones procumbent, and a foot and half long: the leaves thick, narrowing into a short petiole, subsessile, entire, flat, somewhat waved, opposite on the branches, at the flowers single; that is, the flowers come out singly on a peduncle opposite to a leaf; these, the stems, peduncles, calyxes, and germs, are covered with very minute shining dots, which when examined with a magnifier appear to be clear drops like ice: the flowers have no scent, and are open from three to six in the afternoon. It is a native of the Cape, flowering from April to October.

In the sixth the plant whilst young is herbaceous, but becoming shrubby by age: the trunk is then woody, a finger or more in thickness, covered with a brownish ash-coloured bark: the branches are decumbent, divaricating whilst young, cylindric, tender, covered with minute pimples, dark green, thick, fleshy, the bark when old becoming somewhat woody, and assuming various flexuose contorted directions: all the branches are nearly of the same thickness; but the upper ones are shorter, and more woody next the stem: the leaves are mostly opposite, but not always so, especially on the flowering branches, smooth, cylindric, convex beneath, slightly channelled above, minutely pimpled: the flowers are small. It is a native of the Cape, flowering from June to August.

In the seventh, the trunk, which attains the thickness of the little finger, is smooth and even, covered with a bay-coloured bark, and has frequent joints where branches have fallen: the branches are opposite, spreading irregularly, and decumbent from the weight of the leaves: the leaves pale green and slightly glaucous, obtusely triangular, smooth and even, opaque, minutely and thickly dotted so as to make a very fine net: the lower ones longer; their upper ones, whence the peduncles arise, shorter and thicker: the calyx four-cleft: the petals narrow, the inner ones gradually shorter, inwardly white, outwardly purple: the flowers are closed during the day, open in the evening, and continue so during the night, at which time they are very sweet. It is a native of the Cape, flowering from June to August.

There is a variety in which the flowers are sowewhat larger, and of a very pale yellow on the outside.

The eighth species has woody stems, a foot and more in length, with many short branches and clustered leaves, with which they are so loaded that they cannot support themselves: the leaves are short, bluntly three-sided, thick, smooth, and shining, pale green, scarcely if at all glaucous, with a few thick green dots: the flowers solitary, at the ends of the branchlets, on very short peduncles, large, whitish or very pale yellow within, reddish on the outside and at the tips: the petals very narrow, the inner ones gradually smaller: they appear in July and August, and open before and after noon when the sun shines, opening and closing several times, and finally closing about the fruit, which is ovate, with five lines or angles, five-celled. It is a native of the Cape.

The ninth has woody stems, forming a regularly branched handsome shrub, standing without support, with a stout stem, from two to three feet high and even more; the branches many, spreading every way, having four lines running along them, which give them the appearance of being quadrangular: the leaves are subtri-

quetrous, wrinkled, bending this way and that, somewhat resembling bulls' horns, glaucous, except the younger ones, which are green and less wrinkled; when held up to the light they appear to have innumerable pores: from one axil of each pair of leaves, sometimes from both, one pair of leaves usually springs, which becomes a shoot, with several pairs of leaves on it: the flowers terminating, white, opening when the sun shines, from seven or eight in the morning to two or three in the afternoon, and smelling like those of May- or White-thorn. It is a native of the Cape, flowering from June to September.

The tenth has the stems and branches irregular and distorted, as in the thirty-ninth sort, from which, however, it differs in being somewhat higher and more branched; the branches interwoven, less woody, but softer and more fleshy, with the bark smoother and of a paler yellow; the leaves greener, something wider and thinner, with the ridge on the outer and the groove on the inner part more conspicuous, though less concave; the dots rather oblong than round, shining like silver in the sunshine; they are not produced in bundles, as in that sort, but more loosely, and decussated: the flowers are somewhat larger and paler: the petals rather wider, becoming yellowish with age. It is a native of the Cape, flowering in July and August.

In the eleventh the leaves are numerous, either upright or bending upwards, rigid, thick, and fleshy, about a finger's length, appearing to be round, but slightly flatted on the inside, especially near the base; they are deep green and glaucous, thickly set with small green dots and some transverse lines, pointed at the end; the point purple or green: the flowers solitary, on a short scape from the centre of the plant, large: the calycine segments are unequal: the petals very narrow, white, shining like silver in the sun, void of scent, opening about noon in July, August, and September. It is a native of the Cape.

The twelfth species has the leaves clustered, decussated, from an inch to two inches in length, deeply glaucous, flat above, but below produced into a sharpish back, towards the end, both above and below, or on all the sides armed with stiffish sharp toothlets; they are smooth, and do not appear to be dotted unless they are held up to the light, but they have a few transverse wrinkles: the peduncles are from an inch to an inch and half and two inches in height, tender, round, usually leafless, but sometimes having a pair of leaves: the flowers are solitary, terminating, the form and size of a Daisy, whitish with a tinge of purple, and streaked with a purple line along the middle of each petal both within and without; they spread out regularly in two or three rows, and are sometimes entire, sometimes cut a little at the end, opening about noon. It is a native of the Cape, flowering from June to August.

The thirteenth has the peduncles one-flowered, two-leaved: the corollas pale purple, sweet-smelling, not longer than the calyx: the stamens white, upright, and forming a cone: the anthers are yellow: the flowers open in the morning as soon as the sun shines strongly upon them. It is a native of the Cape.

There are different varieties; as the Great Delta-leaved, the Small Delta-leaved Marigold.

In the fourteenth species, the leaflets of the calyx being bearded at the tip, as well as the leaves of the plant, show the origin of the perianthium. The least interior petals, which surround the stamens, are white. It is a native of the Cape.

There are several varieties; as the shrubby, bearded, the small dwarf-bearded, and the great dwarf-bearded.

The fifteenth has the peduncle very rugged downwards, rather to the sight than the touch: the calyx is awnless: the flower is sweet-smelling, very like that of the preceding, from which perhaps it originally sprung, losing the beard of the leaves, and having it scattered over the stem. It is a native of the Cape, flowering the greater part of the year.

There are different varieties; as the purple flowered, the pale flowered, and the striped flowered.

The sixteenth species has the leaves linear, semicylindric, channelled-flat, opaque, with villose hairs scattered over them, especially at the base: the stem is pubescent, with villose hairs scarcely standing out: the plant is hairy, prostrate, finally shrubby: the branches in distant pairs, crossing each other, axillary, cylindrical, covered with the permanent, cylindrical, hairy sheaths of the connate leaves, whose hairs are not very thick set, but short, white, and rather pressed to the stem; some of them expanding, but pointed upwards: the leaves are less succulent than those of any other species, connate, but appearing distinct, unless attentively examined; they are linear, scarcely pimpled, or, if so, the pimples are extremely minute, shining in the sun, and of a dark green colour; they are channelled above, with a convex or rounded keel, slightly attenuated both ways, rather dilating again at the very base, and embracing the stem, where they are quite destitute of succulency, and slightly membranaceous at

the edges, with a white midrib: the membrane at the base is ciliate; the rest of the leaf nearly smooth, or having distant small white hairs scattered over both sides: the flowers are solitary, terminating, rarely seen, opening to a very warm sun only in the forenoon. It is a native of the Cape.

The seventeenth species has woody stems, at bottom bay: the branches yellowish-brown, procumbent, round at bottom, but somewhat angular above: the peduncles, however, are round: the leaves are acutely triquetrous, glaucous, somewhat shorter and thicker, rougher and more rigid, with frequent tubercles larger and whiter, especially on the back, than in the fortieth sort: the flowers are solitary, few (two or three), violet purple and shining, but becoming paler, opening two or three times, before and after noon: the petals mostly of the same size, entire or slightly cloven at the end, firmly connected at the base; they end suddenly in filaments, which are not scattered, but collected into a head about the stamens, like a crown. It is a native of the Cape.

The eighteenth has the leaves between papulose and tubercled; much rougher, more glaucous, and more acutely pointed, than in any other reptant species: the branches are angular, and finally somewhat woody: in its triquetrous leaves and reptant stems it is allied to the twenty-fourth sort. In the open air it will extend the branches above a foot and a half every way, and they are fixed firmly to the ground at every joint by strong fibres. It is a native of the Cape, flowering in July and August.

The nineteenth species has the stems slender and round: the branches rather frequent, reclining, with much smaller and more recurved leaves having only one short spinule at the back: they end in a spinule short and whitish: the stems and branches, though rigid, are procumbent: the leaves, and internodes, which are elongations of the leaves, investing the stems, are dotted with small dots of a fuller glaucous green colour, and not so white: the bark of the stem rather of a yellow and brown dusky whitish colour: the internodes are thickened above, and narrower beneath: the flowers are axillary, on leafy peduncles. It is a native of the Cape, flowering from June to August.

There are different varieties.

The twentieth is an upright thorny shrub, from two to three feet high, much branched: the branches opposite, axillary, ascending, roundish-compressed, with a smooth cinereous bark, throwing out in various places branching spines: the leaves are in pairs, at an interval of an inch or an inch and half, glaucous, with frequent green dots, pellucid when held up to the light; all the angles blunt, slightly swelled at the inner bases, very firm to the touch, terminating in a very small white cartilaginous point, or harmless bristle: the upper leaves are much shorter: the spines appear as if terminating, but soon cease to be so, from the protrusion of young shoots; they are branched, nearly horizontal, divaricating and trichotomous, each from half an inch to an inch in length, awl-shaped, very sharp, resembling those of the common Hawthorn, but not so strong or pungent, covered with a grayish bark, and beset with a pair of distinct, opposite, chiefly barren leaves, like those of the branches, but only a-third of the size: the flowers small, pale violet purple, on slender, leafless, green peduncles. It is a native of the Cape.

The twenty-first species forms a low, much branched, spreading shrub; and, when old, has a very large tuberous root, sometimes as big as a man's head, partly protruded above the surface: the stem woody, very thick at bottom, covered with a bay-coloured bark: the branches bending, entwined: the leaves short, bluntly triquetrous, with the back convex, the inner or upper surface somewhat swelling, subglaucous, with silver dots, so small as not to be visible except when the sun shines: the flowers are at the ends of the branches, on slender cinereous, or reddish peduncles; are small, of a pale red or vinous colour: petals not numerous, broadish, blunt, equal in size: the stamens collected into a bottle in the middle. It flowers about noon, and is a native of the Cape, flowering from June to September.

It is observed, that in old plants the extreme branches sometimes become thorny; which thorns are the peduncles of the preceding year; thorns also sometimes come out from the forkings of the branches, instead of flowers.

The twenty-second has the stems woody, procumbent, slender, round, with a yellowish bark: the branches from each of the upper axils: the leaves on the inner surface flat, on the outer convex, bright green, inclining to gray, from their slenderness often hanging down, appearing dotted when held up to the light: the flowers at the ends of the branches solitary, on long slender peduncles; they are large, especially on young plants, pale scarlet, shining, and appearing powdered with gold dust in full sunshine: the petals very numerous; the inner ones gradually smaller, entire or cuspidate at the end, sometimes slightly bifid, cohering at bottom: the flowers abundant, and opening several days successively about noon, especially in June.

According to Mr. Haworth, in many stages of

its growth it is very liable to be taken for the twenty-seventh sort, and that it frequently emits roots from the joints of the stems, and thereby becomes creeping. It is a native of the Cape, flowering from June to September.

The twenty-third species is an upright plant, woody, firm, growing to a larger size than most of the species: the flowering-stem is rigid and somewhat gray: the branches axillary, opposite, from erect spreading, crossing each other in pairs, and beset thickly with young leaves on their first outset, whitish or glaucous, but finally brownish, gradually shorter upwards, forming a beautiful pyramidal glaucous plant, well covered with fine leaves; these when full grown are from two to three inches long, slightly curved upwards or falcate, very glaucous, crossing each other in pairs; very much compressed at the sides, having pellucid dots scattered over them, flattish above and mucronate: the flowers terminating in a sort of corymb, large, showy, purple. It is a native of the Cape.

The twenty-fourth has the stems a palm or long span in length, creeping, when young herbaceous and soft, three-sided, green, frequently purple next the sun; when old, more round, still not woody but soft, tough, and fungous, covered with a cinereous bark: the leaves are usually in the same plane, or not decussated, divaricating, or not approximating like many of the other species, thick, succulent, bluntly three-sided, smooth and somewhat shining, green: the flowers on short peduncles, sometimes naked, but more frequently with a pair of leaves on them; solitary, small, violet purple: the petals not very numerous: the stamens many, short, not very much scattered, but not collected into a head or upright. It creeps so much that it seldom flowers, and when it does the flowers do not continue long. It is a native of the Cape.

The twenty-fifth species is a very low, bushy, divaricating almost decumbent shrub, rarely more than six or eight inches high: the branches are opposite, slightly angular, axillary, divaricating, and densely crowded: the leaves very minute and much crowded, glaucous, having smooth pellucid dots, attenuated at the base, very gibbous on the keel, sharply incurved or falcate, near a quarter of an inch long, and ending in an acute, white, just perceptible, bristly point in the direction of the leaves: the flowers are purple, large, solitary, opening in the morning, on short terminating peduncles; the leaves are sometimes so much incurved as to form half a circle, and are remarkably small. It is a native of the Cape.

The twenty-sixth is a small, very bushy, rather glaucous shrub, from six inches to a foot or more in height: the branches almost upright, or often diffuse and panicled, round whilst young, slightly angular when old, covered with a brown bark, for the most part opposite and crowded: the leaves are also opposite and crowded, rather glaucous, having pellucid spots, usually distinct, but sometimes confluent; they are subtrigonous with blunt angles, awl-shaped, attenuated at the base, slightly incurved, sometimes almost sabre-shaped, from three quarters of an inch to an inch and half in length: the flowers are very numerous, reddish purple, like those of the thirteenth sort but more handsome, expanding in the fore part of the day in such profusion as often to cover the surface of the plant: petals linear, numerous. It is a native of the Cape, and flowers from June to August.

It is very variable, assuming different appearances, according to its treatment, and the different stages of its growth: its very numerous beautiful purple flowers, covering the whole plant, and produced every season, make it a valuable species.

The twenty-seventh species grows up into a long, slender, and not much branched shrub, from a foot to two feet high and more: the leaves are slender, oblong, bluntly three-sided, green, not glaucous, rugged to the sight, not the touch, with frequent green tubercles, which when held to the light appear whitish and pellucid: similar tubercles are observed in the lower part of the fruit: the flowers terminating, middle-sized, golden within, red on the outside. It is a native of the Cape, flowering from May to September.

The twenty-eighth is an elegant species, three quarters of a yard in height, with woody stems, not so thick as the little finger, and not much branched, procumbent, covered with an ash-coloured bark: the flowers are on the upper branches, solitary, terminating, large, of an elegant yellow colour, composed of two or three rows of petals, which are blunt, entire, and sometimes jagged, the outer longer and flat, the inner suddenly shorter, more erect, concave, and at their base a circle of saffron-coloured anthers on very short filaments; the bottom of the flower being void, smooth, and even, hollowed out like a dish: they open several times from eight in the morning to three or four in the afternoon if the sun shines, and have a little smell. It is a native of the Cape, flowering in June.

The twenty-ninth species has stems from a foot to two feet in height, procumbent, woody, and much branched: the branches are round,

slender: the leaves in pairs, at an inch or an inch and half distance, an inch in length, thickish, on an old plant narrower and shorter, on a young one longer and thicker, not quite round, but obtusely triangular, with the angles, however, so blunt that they are rather cylindric than three-sided; are overspread with glittering spangles of a greenish yellow colour: the stems and lower branches are bay-coloured and smooth; the upper ones reddish brown, rough to the touch, with many whitish dots, which were originally spangles: the peduncles and calyxes shine with spangles like those of the leaves, but thicker: the flowers are terminating, on peduncles from an inch to an inch and half in length; they are large, concave, with the margin bent back, composed of numerous petals, cohering to the base, gradually smaller, and filamentose in the middle, of a dirty red colour on the outside, but within very dark orange-coloured, deepest at the edge; the narrow middle petals next the white filaments being very dark, by which it is easily distinguished from the other sorts. It is a native of the Cape, flowering from May to August.

It varies with paler smaller flowers.

The thirtieth has the stem woody, from a foot to two feet in height, covered with an ash-coloured bark, deformed by age with irregular wide fissures, knotted and jointed, divided and subdivided into several opposite branches: the leaves so bluntly triangular as to appear to be round, an inch and half or two inches in length, the size of a swan's quill, with dense bundles of other leaves coming out from the axils, glaucous, smooth, appearing pellucid when held up to the light, purple at the end, as are also the branches: the branches and leaves are at short intervals; and, affecting an upright position, this plant has the appearance of a shrub, though probably it would be weighed down by the number and size of the leaves and branches: the flowers are in a sort of umbel at the ends of the branches, from the axils of the leaves, small, pale yellow, and sweet smelling. It is a native of the Cape, flowering in May and June.

It varies with shorter and more manifestly three-sided leaves and fewer flowers.

The thirty-first species has the stems half a yard high and more, woody, with frequent joints, ash-coloured, with fissures at bottom, bay-coloured and more smooth above: the lower and middle branches are twisted, the upper ones are straight and little divided: the peduncles an inch and half or two inches long: the flowers large, pale yellow, or sulphur-coloured on both sides, sometimes slightly tinged with red on the outside: the petals long, narrow, cuspid, with smaller ones interspersed among the others: they remain expanded only a few hours, and contract about noon: but open several times, and have a succession during the summer months. According to Mr. Haworth, it is a strong upright shrub, the flowers being produced only by old plants, and by them but sparingly. It is a native of the Cape, flowering in June and July.

The thirty-second species has the stems longer, less pressed to the ground than the variety below: all the leaves at the joints are very long, more thick and glaucous: the peduncles not naked, but surrounded by a pair of short leaves: the flower of a deeper yellow colour, with a red line along the back: the stamens numerous, neither collected nor much scattered: yellowish, and whitish anthers: the styles very many, (according to Linnæus, ten) reddish, slender, villose: the capsules round, depressed, fifteen- or sixteen-celled, with a crown on the top of the same number of rays: the leaves which spring from the axils of the larger ones are less frequent and less bent in; but these younger leaves have the angles more acute, and are more glaucous than the longer leaves at the joints, which the nearer they are to the root, the paler and more flaccid they seem to be; the rest are more rigid and succulent, not wrinkled, and scarcely dotted, but the lower ones have transverse lines on their flat sides, are somewhat wrinkled, and much dotted underneath: the flowers are flat, and continue some days expanding about noon.

There is a variety which throws out many procumbent branches, tough at the lower part, but not properly woody, herbaceous at the upper part, about three inches in length, round or slightly angular, jointed at short intervals, with bluntly triangular leaves, from which other leaves spring in bundles, of the same form, but shorter; the root-leaves and those at the base of the branches remarkably long: the leaves bend like the horns of kine, whence the trivial name; they are somewhat glaucous, become soft and flaccid, and then appear marked with many lines and dots: the peduncles six inches in length, or nearly so, and naked: the flowers the size and almost the form of those of Dandelion, but paler, or sulphur-coloured, composed of numerous petals, of which the inner ones are shorter, with a red purple streak running along the middle on the outside, the same tinge appearing at the extremity and base of the petals. It is a native of the Cape.

The thirty-third is stemless whilst young, but acquires by age considerable trailing woody

stems: the leaves are connate, spreading, glaucous, opaque, not marked with lucid dots, somewhat sabre-shaped, or attenuate from the middle downwards to the base, where they are semicylindric; thickening towards the points, where they are triquetrous, with a sharp keel, and sides edged with irregular harmless teeth; terminating in a similar tooth, placed on the inner side: the flowers are large, showy, yellow, opening in the afternoon, and closing in the evening. It is a native of the Cape, flowering from May to July.

There is a variety which is entirely sessile, of a whitish glaucous colour, with the leaves paler at the base, with frequent round whitish dots, especially towards the end; they are shorter than those of the preceding, more resupine, less triquetrous, but with a rounder back, and more frequent, longer, incurved prickles, terminated by slender harmless spinules, which are sometimes white, sometimes reddish: the leaves have a white line at the end, which is continued towards the back: there is first a flower in the middle, and afterwards several come out successively at the sides, all sessile. It is called *Cat-Chap* Marigold.

Mr. Haworth has two other varieties; the *Tiger-Chap* Fig-Marigold, which is stemless in all the stages of its growth; being more succulent and gross than the following: the leaves are rather shorter, beset with much longer hairs on the sides, and having numerous whitish spots: the flowers are sessile, yellow, and large;—and the *Mouse-Chap* Fig-Marigold, in which the branches in very old plants are some inches long, and numerous, forming a fine tufted plant: the leaves connate, when young resembling the gaping jaws of a small quadruped, the denticulations on each side resembling teeth; when old, the leaves spread out, and are even recurved; all very glaucous, only about a fourth part of the size of the others, and often roughly dotted: the dots lucid, elevated into small tubercles: the flowers small and of a yellow colour.

The thirty-fourth species at first is a low plant, but it becomes larger and stronger; it does not however rise above a long span in height in six years: the stem is then thick and woody, and several reclining twisted branches spring from it alternately, covered with a dusky reddish bark, smooth, but transversely chinked and irregular; at the end of which come out several leaves disposed crosswise; they are thickish, bluntly flat at top, with a roundish back below, more compressed towards the end, and terminating in a process at the lower part; their colour is deep glaucous green, except the old ones, which are yellowish, and when dry, brown: the whole covered with frequent green dots, pellucid when held up to the light, protuberant towards the end of the leaves, and rendering them somewhat rugged there: the peduncles an inch and half or two inches long, bracteated: the flowers opening in the afternoon, (about four o'clock) coming out frequently several from the same peduncle, but much smaller, and of a paler yellow colour than in the *Dog-Chap* Fig-Marigold. It is a native of the Cape, flowering from May to July.

The thirty-fifth is a middle sort, between the caulescent and sessile ones, properly belonging to those which are procumbent, and acquiring by age woody branches, short and pressed to the ground, from which, at short distances, and on short slender woody petioles, of a dusky pale brown colour, spring thick leaves in clusters, bright green and shining, triquetrous inclining to round, wider towards the base, and somewhat flatted on the upper part, the lower part rounded, towards the middle, where the flat part ends; some short processes come out on both sides, sometimes on one side only, and sometimes they are wholly wanting; hence towards the point the leaves take a different form, and have the sides from round flatted; they are not however broad and flat, but triquetrous-cylindric. It is a circumstance peculiar to these leaves, that one side of each is much shorter than the other, and hence they are called difform: they have frequent largish dots on them, which appear pale and pellucid, but sometimes dusky green; they are generally protuberant, and thereby render the surface irregular: the peduncles thick, herbaceous, bluntly triquetrous, from half an inch to an inch and half in length: the flowers rather large, like those of the Tongue-leaved sort, but somewhat smaller, and of a deeper yellow, internally of a shining golden colour, externally of a reddish saffron-colour, and when far advanced, saffron-coloured within. It is a native of the Cape.

The thirty-sixth species has the lower leaves oblique, the others more upright, not at all or but little bent in or sickle-shaped; they are long, thick, rigid, smooth and shining, flat within or on the top, underneath produced into a sharpish back, which becomes blunter and rounder in the lower part; all the sides are nearly equal: they are of a white elegantly glaucous colour, except that they are yellowish near the base with slender transverse lines: the flowers are large, yellow, on a long thick peduncle.

The thirty-seventh has the leaves in it as well as in all the varieties not decussated, but lying in the same oblique plane. It is a native of the Cape.

There are several varieties.

In the first, the leaves are wide and compressed about the edge: the flowers somewhat large, with blunt petals, scattered and not numerous, with scarcely any peduncle: one plant has several heads, from each of which are produced clusters of leaves in pairs, disposed like those of the Tongue Aloes, but with the edges not horizontal but oblique: there are generally three or four pairs of these leaves; they are broad and thick, flat above, pillowed below, bright green, smooth and shining, sometimes blunt, sometimes a little pointed, generally in the shape of a shoemaker's knife: the younger leaves in this and the other varieties are folded together and obliquely inserted into each other: the flowers come out successively in August and September from the axils, beginning with the lowest, they are subsessile, large, yellow, somewhat paler than in the following variety, shining in the sun: petals somewhat blunter, entire, or sometimes cut here and there.

The Broad Tongue-leaved variety has thick leaves, flat above, convex beneath, with the margins thicker and less upright than in the preceding, smooth and shining, pale green, especially toward the base, when held up to the light appearing to be composed of innumerable vesicles: three or four pairs of these leaves lie in the same inclined plane; these are sometimes flatter and blunt at the end, sometimes very much cut at the edge: from the lower pair first, and then from the next, a short peduncle arises, obtusely triquetrous, bearing a large flower of a shining golden colour, with many stamens, having oblong golden anthers.

The Narrow Tongue-leaved variety is very like the preceding, but the petals have a slight tinge of red on the outside: the older leaves are more reflex; the younger ones, which are closer and more luxuriant, are somewhat twisted in and excavated, and are of a fuller green colour: the fruit is smaller and softer, not elevated, but rather depressed, roundish, and commonly streaked with eleven angles; it is generally eleven-celled; the cells being the same in number as there are horns of the style, which are depressed at the bottom of the flower under the stamens, and are curled and wrinkled: the petals in two or three rows, almost of the same length, of a shining yellow colour. It flowers in August and September.

There is another variety, which is distinguished from the others by the leaves being longer and more erect: the peduncles of the flowers longer: the capsules less globular, commonly divided into nine cells: the calycine segments four, three longer and narrower, one shorter and broader, with a membranaceous margin: the flowers have a double or triple row of petals, shining in the sun with the splendour of gold: the stamens numerous, with oblong saffron-coloured anthers.

The thirty-eighth species grows up into a stem an inch and more in thickness, and two or three feet in height, standing upright with little or no assistance, with a crown of clustered leaves a long span in length at the top, and branches a foot long and more at the base, which hang down with the weight of a multitude of leaves: very old plants grow a yard in height, with long incurved twisted branches: the stems and lower branches are of a dusky yellowish colour, but the upper flowering branches green; on the lower part of these the leaves are alternate, but on the upper part, where the flowers come out, clustered and somewhat shorter, in pairs at short intervals, triquetrous, with equal angles, slightly grooved on the sides, especially on the inner side; but the alternate ones have the inner side rather flat: they are not dotted, but are of a deep green, almost glaucous, like the leaves of Pinks, at the angles towards the base tinged slightly with purple: the peduncles from the axils of the upper leaves a span in length, thick, at first hanging down, but afterwards erect: the flowers large, expanding when the sun shines, straw-coloured above, tinged with red underneath, composed of numerous slender cuspid petals, gradually smaller, and the inner ones filamentose. The flowers are open from eight or nine in the morning to four or five in the afternoon. It is a native of the Cape, flowering from May to August.

The thirty-ninth has the stem short, thickish: the branches unequal, spreading irregularly on the ground, covered with a smooth bark of a dusky yellowish colour, with other smaller simple ones springing from them, which are also irregular and twisted: the leaves are pointed, slightly excavated within in the middle, the outer part produced and swelling, of a yellowish green colour, with frequent minute dots regularly in lines: the flowers are somewhat small, but white: the petals narrow, peduncles short, so that the flowers frequently scarcely emerge from the bundles of leaves: they are filamentose, and where white shine with a silvery brightness in the sun; but in the middle, next the stamens, are slightly tinged with yellow, and shine less: they are without scent, open two or three times, and in the day time only. It is a native of the Cape, flowering from June to October.

The fortieth has the stem shrubby, but procumbent; even when tied up its irregular twisted branches will hang down: they are round towards

the top, and of a yellowish bay colour, but quadrangular at the bottom: the leaves tender, mucronate, curved inwards, in bundles, acutely triangular, deep green and glaucous, having small dots and tubercles: the flowers are several, terminating, middle-sized, with scarcely any odour, on slender oblong peduncles: the calycine segments sometimes hooked, sometimes not: the petals very many, lying one over the other; the outer larger, bifid or trifid at the end; the inner ones gradually smaller, entire, but not filamentose: they are of a most vivid violet purple colour, but the flowers expand only about noon, when the sun is very hot: the flowers continue long, and open several times if the sun shines hot. It is a native of the Cape, flowering from June to August.

The forty-first species is from a foot and half to two feet in height: the stem not very shrubby, nor very thick: the branches woody, the thickness of a straw, procumbent, round, covered with an ash-coloured bark: the upper shoots of a yellowish bay colour, becoming pale herbaceous; they are broadish immediately under the flowers, thence gradually more slender, slightly compressed, and winged on each side with a process from the back of the leaves: the leaves difform; those which are fastened to the peduncles (bractes) short and thick, the others longer and not so thick, with other smaller leaves from the axils; all uncinate, subglaucous, rugged with frequent tubercles of the same colour, which when held up to the light appear to be so many porous dots: the flowers are on peduncles from an inch to two inches in length, alternately axillary, small, pale purple, petals twisted about, narrower towards the base, broader towards the end, entire, in a single row, smelling like those of the Hawthorn, open both day and night, for a long time, and in great abundance, there being a succession of them from July to October. It is native of the Cape.

Culture.—The annual and biennial sorts may be increased by sowing the seeds in the early spring months, on a fresh hot-bed, covered with sandy earth, or in pots of fine sandy mould.

When the plants have attained a few inches in growth, they should be planted on fresh hot-beds, or in pots plunged in them, to bring them forward; and when they have taken root, they should have very little water: when large enough, each should be planted in a small pot, filled with light fresh earth, but not rich, plunging them into a hot-bed of tan, shading them in the heat of the day until they have taken new root, when they should have plenty of fresh air. About the beginning of summer some of the plants may be inured to the open air, and afterwards be turned out of the pots, and planted with balls of earth about them in a warm border, where they often thrive and spread, but are not very productive of flowers in this way. Some must also be continued in pots, and removed to the shelves of the stove, where they flower more plentifully.

The culture which they afterwards require, is, for those in the pots to have frequent slight waterings in dry weather, and the others kept clean, and their branches permitted to spread upon the surface of the ground.

All the perennial sorts may be easily increased by cuttings planted during the summer months. Those having shrubby stalks and branches, readily take root when planted out in beds or in pots of light sandy soil, covered with mats or glasses: in the latter case, being shaded when the sun is warm. The cuttings of these sorts need not be cut from the plant more than five or six days before they are planted, during which time they should be laid in a dry room, not too much exposed to the sun, that the parts which were separated from the old plants may heal over and dry, otherwise they are apt to rot. They may then be planted at about three inches distance from each other, the earth being pressed very close to them, and none of their leaves buried in the ground, as from their abounding with moisture, when they are covered with the earth it is apt to cause them to rot, which often destroys the cuttings. When they are taken from the old plants, they should therefore be divested of their lower leaves, so as to allow a naked stalk of sufficient length for being planted in the earth.

Those in pots may be plunged in a hot-bed, or in a warm border, due shade and shelter being given, and slight waterings in dry weather. When they have stricken good roots, they should be removed with balls of earth into other separate small pots of light sandy mould, being placed in a shady situation, a very slight watering being given to settle the earth about them. After they become well rooted, they may be removed, so as to have more sun; when they may be kept till autumn, being watered very slightly twice a week in summer and once afterwards, care being taken to prevent their roots shooting through the pots, by shifting them two or three times in the summer, to pare them off.

In the autumn and winter they should be protected in the green-house.

The cuttings of the more succulent sorts should be left to heal over a much longer time, being a little freed from leaves, and covered with glasses to prevent the wet. They should have less water, and be removed less fre-

quently. They succeed well in an airy glass case during the winter, when screened from the frosts.

Such sorts as do not afford cuttings, may also be increased by planting and managing the bottom side-heads or off-sets in the above manner. They may likewise be increased by seeds or cuttings readily in the stove.

The only culture necessary afterwards is, only to give water frequently in small quantities in summer, and very sparingly in winter, shifting the plants occasionally into larger pots.

These are plants which afford a fine variety in green-house collections, and among other potted plants of similar growths.

MESPILUS, a genus containing plants of the deciduous tree, flowering shrubby, and evergreen kinds.

It belongs to the class and order *Icosandria Pentagynia*, and ranks in the natural order of *Pomaceæ*.

The characters are: that the calyx is a one-leafed perianthium, concave-spreading, five-cleft, permanent: the corolla has five roundish concave petals inserted into the calyx: the stamina have twenty awl-shaped filaments, inserted into the calyx: anthers simple: the pistillum is an inferior germ: styles five, simple, erect: stigmas headed: the pericarpium is a globular berry, umbilicated, closed by the converging calyx, but almost perforated by the navel: the seeds five, bony, gibbous.

The species cultivated are: 1. *M. Germanica*, Dutch or Common Medlar; 2. *M. arbutifolia*, Arbutus-leaved Mespilus; 3. *M. Amelanchier*, Alpine Mespilus; 4. *M. Chamæ-Mespilus*, Bastard Quince, or Mespilus; 5. *M. Canadensis*, Snowy Mespilus; 6. *M. cotoneaster*, Dwarf Mespilus; 7. *M. tomentosa*, Quince-leaved Mespilus; 8. *M. pyracantha*, Evergreen Thorn or Mespilus.

The first is a small or middle-sized branching tree: the branches woolly, armed in a wild state with stiff spines, covered with an ash-coloured bark: the leaves oval-lanceolate, serrate towards the point, somewhat woolly, on very short channelled petioles; the bractes linear, as long as the corolla: the calyxes terminating, fleshy, woolly within; teeth longer than the corolla: the petals white, blunt, entire, with a very short claw: the stamens unequal, thirty or more, with cloven anthers: the fruit an inferior turbinated berry, umbilicated at top with a wide depressed area, and crowned with the five linear calycine leaflets, fleshy, reddish brown; pulp thick mixed with callose granules, containing five gibbous, wrinkled, one-celled stones, in each of which are two seeds.

It is observed that the wild tree differs from the cultivated one in having more slender, strigose, thorny branches, and much smaller leaves, flowers, and fruits. Pallas found all the parts very small, in his specimens from Persia, with narrower leaves, serrulate frequently almost to the base. In those from Caucasus the leaves were somewhat larger, and sometimes quite entire: and according to Gmelin, in the Persian Medlar, the leaves are red when they burst from the buds: the spines only three or four lines in length, stout, very sharp, spreading: the styles four or five: the fruit much smaller than in the garden sort. It is a native of the South of Europe, flowering in June and July.

There are two varieties, the narrow-leaved and the broad-leaved; the first growing to a large tree, rising with a straighter stem, and the branches growing more upright than those of the Dutch Medlar: the leaves are narrower and not serrate: the flowers smaller; and the fruit shaped like a pear. It is a native of Sicily.

The latter never rises with an upright trunk, but sends out crooked deformed branches at a small height from the ground: the leaves are very large, entire, and downy on their under side: the flowers very large, as also the fruit, which is rounder, and approaches nearer to the shape of an apple: this, bearing the largest fruit, is now generally cultivated; but there is one with smaller fruit, called the Nottingham Medlar, of a much quicker and more poignant taste. There are also other varieties in the fruit, which are now little attended to.

The second species seldom rises more than five or six feet high, where it grows naturally; and three or four feet is the greatest height it attains in this climate: the branches are few, slender, upright: the leaves alternate, pale green above, ash-coloured underneath: the flowers produced in small bunches, on long peduncles, at the sides and extremities of the branches: the petals dull white, with several brown spots on their upper side: the fruit small, roundish, a little compressed, purple when ripe. It flowers in May, and the fruit ripens in October. It is a native of Virginia.

It varies with red, with black, and with white fruit.

The third rises with many slender stems three or four feet high, putting out small side branches covered with a dark purple bark: the leaves are three quarters of an inch long, and half an inch broad, slightly serrate: the small side branches, which sustain the flowers, are very hairy and woolly, as are also the footstalks and under side of the leaves, but their upper

sides are smooth and green: the flowers come out in bunches at the end of the shoots, are large and white: the petals are long and narrow, and the stamens about ten in number: the fruit small and sweet, black when ripe. According to Linnæus, while young the branches, petioles, peduncles and under surface of the leaves are tomentose; but when so far advanced as to bear fruit, it puts off the pubescence and becomes smooth. It is a native of the South of Europe.

The fourth species has a smooth stalk, about four or five feet high, sending out slender branches covered with a purplish bark: the leaves are about two inches long, and one inch and a half broad, yellowish green on both sides, on long slender foot-stalks: the flowers axillary, four or five together in a close head, purplish; with long, narrow, purplish bractes: the fruit small red. While young, it is also woolly, but when further advanced naked. It is a native of the Pyrenees, &c.

The fifth is a low shrub, seldom more than five feet high, dividing into several smooth branches, covered with a purplish bark: the leaves grow upon long slender foot-stalks; are an inch and a half long, and an inch broad, smooth on both sides, and serrate: the flowers come out in small bunches at the ends of the branches; are about the size of those of the common Hawthorn, and succeeded by small fruit of a purplish colour. It is a native of Canada and Virginia, flowering in April and May.

The sixth species is a low spreading shrub, not more than four or five feet high, covered with a smooth ash-coloured or purple bark, when young pubescent, but becoming smooth with age: the leaves alternate, the upper surface bright green and smooth, the lower white-tomentose, finely netted, about an inch long, and three quarters of an inch broad: the petioles two lines in length, channelled above: there are two lanceolate, acuminate, deciduous, reddish stipules at the base of the petioles: the peduncles either solitary and unbranched from the tops of the twigs, or forming little corymbs of three or four flowers, which are peduncled, somewhat nodding, round and pubescent, with a small bracte at the base. It is a native of many parts of Europe and Siberia, flowering in April and May.

The seventh has a smooth stalk about eight feet high, dividing into many smooth branches: the leaves are two inches and a half long, of a thick substance, dark green on their upper side, but downy on the under, standing upon short foot-stalks: the flowers come out of the side of the stalk, upon short small branches, five or six growing upon each in a close bunch: the petals are of a purple colour, little longer than the calyx, which is woolly, with blunt segments: the fruit is large, roundish, and of a fine red colour when ripe. It flowers in April and May.

The eighth species is a bushy irregular shrub: the branches strigose and rugged, testaceous-brown, divaricated, alternately spinose: the spines are axillary, commonly branched with secondary spines, sometimes gemmiferous and producing branchlets: the leaves scattered, smooth, petioled, continuing till winter, lanceolate with a point, crenate; but in the garden serrate: the corymbs copious on the branches, compound, subsessile, or elevated on the leafy branchlets, on divaricating peduncles: the flowers white, scarcely larger than those of Elder: the berry globular, fulvous, the size of a pea, umbilicated with the calyx; pulpy and five-seeded. But according to Scopoli, the fruit is as large as the common Medlar; the seeds subovate and compressed. It is a native of the South of Europe, flowering in May.

Culture.—They are all easily raised by seeds, layers, grafting and budding; but it is the best practice to raise the Medlar kinds principally by grafting or budding, in order to continue the sorts.

In the first method, the seeds should be sown in autumn, in a bed of common earth, as they usually lie a year, or more, before they germinate, as in the haw and holly-berries, &c.

When the plants appear they should be watered frequently in dry weather; and in the autumn or spring following, the largest be thinned out and planted in nursery-rows, two feet by one asunder; and in another year all the rest may be set out in the same manner; and in three or four years they will be proper for being planted out in the garden or shrubbery.

In the second mode the young branches should be laid down in the autumn in the common method; and they will be properly rooted by the autumn following, when they should be planted out in nursery-rows in the same way as the seedlings.

The two last methods should be performed on stalks of the larger Medlar kinds, or sometimes upon those of the White Thorn, raised from seed, as above; but the Pear-stock is to be preferred for the common Medlars, when intended as fruit-trees. The operations are performed in the usual way, low in the stocks to form dwarfs; and for half or full standards, training the first shoot for a stem, or the stock may be let form a stem, and then be wrought at from about three or four to five or six feet in height. See BUDDING and GRAFTING.

Those intended for fruit-trees, whether dwarfs, half or full standards, in training, should,

for dwarfs, have the first shoots from the graft or bud headed down short in spring, if necessary, in order to force out a proper supply of bottom branches, which must be trained as other dwarf fruit-trees, either for standard-dwarfs or espaliers. When for half or full standards, and wrought low in the stock, the first shoot of each should be trained for a stem, topping it afterwards at the proper height to force out lateral shoots to form the head; but when wrought high in the stock, the first shoots may either be shortened or suffered to grow, as may seem most proper, according to the natural disposition of the leading shoot, in respect to its furnishing lateral branches. After this training for the first year or two, to give the trees their first proper formation, there should not be any further general shortening of the branches, practising it only occasionally to particular shoots, to procure more wood, when necessary, to fill vacancies, to reduce any irregular growth, or to cut off dead parts.

In other respects the branches should be principally left at full length, and the standards left to assume nearly their own natural way of branching. See PRUNING and TRAINING.

They are all hardy, succeeding in any common soil and situation.

The first sort and varieties are cultivated as fruit-trees, principally as standards, but sometimes as espaliers for variety; and are often introduced into the shrubbery plantations. All the other species are proper for ornament in shrubbery or other plantations, where they effect a fine variety, by their different foliage and flowers, as well as their fruit in autumn and winter, which remains long on the branches. They should be disposed—the deciduous kinds principally in assemblage with others of that sort, and the ever-green kind also chiefly with those of their own sort, arranging each sort according to its height of growth; but the last sort, being agreeably ornamental, both as an ever-green and in its numerous clusters of fine red berries in winter, should have a conspicuous situation. From its being of a rather slender growth, it is however commonly trained against walls or the fronts of houses, for the support of its flexible branches, as well as to exhibit its berries more ornamentally. It may however be trained as a standard shrub, like the other sorts, in the open shrubbery; in which case it should be generally trained with short single stems, and permitted to branch out upwards into spreading heads.

MESUA, a genus containing a plant of the exotic shrubby kind, for the hot-house.

It belongs to the class and order *Monadelphia Polyandria*, and ranks in the natural order of *Guttiferæ*.

The characters are: that the calyx is a four-leaved perianthium: leaflets ovate, concave, blunt, permanent; the two outer smaller ones opposite: the corolla has four petals, retuse, waved: the stamina are numerous filaments, capillary, the length of the corolla, connate at the base into a pitcher: anthers ovate: the pistillum is a roundish germ: style cylindric: stigma thickish, concave: the pericarpium is a roundish nut, acuminate, with four longitudinal raised sutures: the seed single and roundish.

The species is *M. ferrea*, Ferreous Indian Mesua.

In its native situation it is a tree with opposite lanceolate leaves, five times as long as the internodes, quite entire, the upper surface smooth and green, the under glaucous and smooth; on very short petioles: the flower in each axil of the leaves sessile: the petal very large and rounded: the germ within the calyx: the style thick, the length of the stamens: the stigma capitate. According to Rheede, it is a very large tree, spreading like the lime, with flowers the size and shape of the wild rose or sweet brier, being much cultivated in Malabar for the beauty of the flowers, which come out there in July and August: and bearing smooth green fruit in six years from the nut. It is a native of the East Indies.

Culture.—This plant may be increased by seeds, layers, and cuttings.

The seeds should be sown in the spring, in pots of light earth, plunging them in a bark hot-bed in the stove. When the plants have attained some growth, they should be planted in separate pots and replunged in the bark-bed, where they must be kept.

The layers should be made from the young branches, and be laid down in the autumn or early spring, being taken off when well rooted, and planted in separate pots, having the same management as the others.

The cuttings should be taken from the young branches and be planted in the summer, in pots of light mould, and plunged in the bark-bed. When they have stricken root, they should be removed into separate pots, and be managed as the others.

They afford variety among other stove plants.

MICHAUXIA, a genus containing a plant of the herbaceous, flowering, exotic kind.

It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Campanaceæ*.

The characters are: that the calyx is a one-

leafed perianthium, sixteen-parted: segments lanceolate, unequal, the alternate ones reversed: the corolla one-petalled, wheel-shaped, eight-parted, larger than the calyx: segments linear-lanceolate, spreading very much, revolute at the tip: nectary eight-valved, staminiferous: the stamina have eight awl-shaped, permanent filaments: anthers linear, very long, pressed close to the style: the pistillum is an inferior, turbinate germ: style columnar, permanent: stigma eight-parted: segments awl-shaped, revolute: the pericarpium is a turbinate capsule, truncated, eight-celled, valveless: cells rhombed: the seeds very numerous, small, oblong, inserted into the receptacles.

The species is *M. campanuloides*, Rough-leaved Michauxia.

It is a handsome biennial plant: the stem simple, panicled when in flower, upright, herbaceous, rough-haired, green, two feet high, the thickness of the little finger, milky, as are also the branches, peduncles and calyxes: the branches alternate, axillary, flowering alll over, spreading, reclining at the end: the root-leaves are petioled, cordate; the next petioled and runcinate: the stem-leaves half-embracing, lanceolate, acute, widening into ears at the base, irregularly gashed, serrate, nerved, wrinkled, rough-haired, rigid, waved, ascending at the sides, purple at the edge, four inches long, an inch and a half wide: the flowers are in a panicle, peduncled, bracted, hanging down, white, four inches in diameter: some slightly tinged with purple on the outside. It was found in the Levant.

Culture.—It may be raised from seed procured from its native situation and sown in the early spring season, in pots plunged in a hot-bed, or on a moderate hot-bed. When the plants have attained a little growth they should be removed into separate pots and be re-plunged in the hot-bed. It must afterwards be managed as tender green-house plants.

It affords variety in collections of this sort.

MICHELIA, a genus containing a plant of the tree or shrub kind.

It belongs to the class and order *Polyandria Polygynia*, and ranks in the natural order of *Coadunatæ*.

The characters are: that the calyx is a three-leaved perianthium: leaflets petal-form, oblong, concave, deciduous: the corolla has fifteen petals, lanceolate; the outer ones larger: the stamina have very many awl-shaped filaments, very short: anthers erect, acute: the pistillum has numerous germs, imbricate in a long spike: styles none: stigmas reflex, blunt: the pericarpium berries (berried capsules) as many, globular, one-celled, half-bivalved, dispersed in a raceme: the seeds four, (from two to eight,) convex on one side, angular on the other.

The species is *M. Champaca*, Champaca or Indian Michelia.

In its native situation it is a lofty tree, with a trunk as large as a man can compass, covered with a thick ash-coloured bark, but in this climate it is only the size of a shrub: the leaves are a span or more in length, and four or five inches in width, contracted into an oblong narrow point, of a hard texture, flat and smooth, dusky green above, brighter green beneath, on petioles an inch in length: the flowers on the extreme twigs, axillary, on thick, upright peduncles an inch and a half in length, and having a very fragrant smell: the petals narrow, in three rows; in the outer row eight, three times as broad as those in the middle row, which are also eight; towards the top they are more round and sometimes pointed or cusped, but less so than in the middle row: in the inner row they are small, short, very much cusped towards the top, pale yellow: fruit oblong spheroidal, with a thickish rind, first green, then pale whitish yellow, having a very sharp taste, and not very pleasant smell. It is a native of the East Indies.

Culture.—This plant may be increased by seeds, layers, and cuttings, managed in the same manner as the above sort.

It affords variety in collections of stove plants.

MILFOIL. See ACHILLEA.

MICE, a sort of vermin highly destructive to several sorts of garden crops, such as peas and beans in the early spring, and lettuces, melons and cucumbers in frames in the winter season. When discovered they should be immediately destroyed. See VERMIN.

MILDEW, a vegetable disease very hurtful to some kinds of plants. It is supposed to proceed from different causes: some consider it as a kind of thick clammy moisture, which falls on, or rather transpires from, the leaves and blossoms of plants, which, by stopping up the pores, prevents perspiration, and hinders their growth. The author of The Philosophy of Gardening suspects it to be a plant of the fungous kind, which grows without light or change of air, and with its roots penetrates the vessels of the vegetables to which it adheres, which are probably previously diseased, and thus deprives them of their due nourishment. But what is commonly denominated mildew is an insect which is frequently found in vast numbers feeding upon the effused moisture. In a treatise upon this

disease by Mr. Segar, it is conceived to be of a very sharp corrosive nature, and by its acrimony to hinder the circulation of the nutritious sap; in consequence of which the leaves begin to fade, and the blossoms and fruit to be greatly injured.

The author first mentioned conceives the best method of removing it to be by admitting more light and air, by proper thinning or pruning so as to restore the natural vigour of the plants.

Mr. Forsyth has observed that, "contrary to the common opinion, trees are more liable to mildew on south and west walls, than on an east wall; and has frequently removed such trees from a south or west wall, to a north or east wall, where they have perfectly recovered.

He advises "whenever danger is apprehended, to wash or sprinkle the trees well with urine and lime-water mixed; and when the young and tender shoots are much infected, to wash them well with a woollen cloth dipped in the following mixture, so as to clear them of all the glutinous matter, that their respiration and perspiration may not be obstructed.

"Take of tobacco one pound, sulphur two pounds, unslaked lime one peck, and about a pound of elder-buds; pour on them ten gallons of boiling water; cover it close and let it stand till cold; then add as much cold water as will fill a hogshead. It should stand two or three days to settle, when the scum may be taken off, and it is fit for use.

"There is a sweet saccharine substance found on the leaves of certain trees, which is generally but erroneously supposed to fall from heaven like dew. It is known by the title of *Honey-dew*. There are supposed to be two kinds of it, one of which" Mr. Forsyth says "transpires from the leaves of the trees where it is found; and the other is the excrement of a small insect called a Vine-fretter, a species of the Aphis. Bees and ants are very fond of both these kinds of honey-dew." As this exudation, "by its viscous quality," closes up the pores and stops the perspiration of trees, it must of course," he thinks, "be very hurtful to them."

It is a vegetable disease, which should, in his opinion, be treated in the same manner as the mildew, by washing at the same times.

MIMOSA, a genus containing plants of the shrubby and under shrubby kind.

It belongs to the class and order *Polygamia Monœcia* and ranks in the natural order of *Lomentaceæ*.

The characters are: that the calyx is a one-leafed perianthium, five-toothed, very small: the corolla has one petal, funnel-form, half-five-cleft, small: the stamina have capillary, very long filaments: anthers incumbent: the pistillum is an oblong germ: style filiform, shorter than the stamens: stigma truncated: the pericarpium is a long legume, with several transverse partitions: the seeds many, roundish, of various forms.

The species cultivated are: 1. *M. plena*, Double-flowered Annual Sensitive Mimosa; 2. *M. viva*, Lively Mimosa; 3. *M. quadrivalvis*, Quadrivalve-podded Humble Mimosa; 4. *M. sensitiva*, Sensitive Plant; 5. *M. pudica*, Humble Plant; 6. *M. virgata*, Long-twigged Mimosa; 7. *M. punctata*, Spotted-stalked Mimosa: 8. *M. pernambucana*, Slothful Mimosa; 9. *M. asperata*, Hairy-podded Mimosa; 10. *M. pigra*, Slow American Sensitive Plant; 11. *M. glauca*, Glaucous Mimosa; 12. *M. cornigera*, Horned Mimosa, or Cuckold Tree; 13. *M. horrida*, Horrid Mimosa; 14. *M. Farnesiana*, Farnesian Mimosa, or Sponge Tree; 15. *M. Nilotica*, Egyptian Mimosa; 16. *M. verticillata*, Whorl-leaved Mimosa; 17. *M. arborea*, Rough Tree Mimosa; 18. *M. Lebbeck*, Lebbeck, or Egyptian Mimosa; 19. *M. latisiliqua*, Broad-podded Mimosa; 20. *M. tamarindifolia*, Tamarind-leaved American Mimosa; 21. *M. circinalis*, Spiral Mimosa; 22. *M. pennata*, Small-leaved Mimosa; 23. *M. latifolia*, Broad-leaved Mimosa; 24. *M. purpurea*, Purple Mimosa, or Soldier Wood; 25. *M. reticulata*, Netted Mimosa; 26. *M. scandens*, Climbing Mimosa; 27. *M. myrtifolia*, Myrtle-leaved Mimosa; 28. *M. suaveolens*, Sweet-scented Mimosa.

The first, when cultivated in the garden, has great resemblance to the seventh sort; but the stalks never grow so erect, the wings of the leaves are longer, and stand more horizontal: the heads of flowers are much larger, the stamens are longer, and the flowers on the under side of the spike which have no stamens are double; the pods also are shorter, and much broader than those of that sort.

It is annual; the stems round, herbaceous, smooth, procumbent, rooting at all the joints: the leaves three-paired or four-paired, contracting with the least touch: from the axils of these spring erect peduncles, four or five inches high, with scales the whole length, sustaining handsome, yellow, almost globular heads, the same size with those of red clover: the flowers different in shape, nature and use; those in the middle truly five-petalled, in small five-cleft calyxes, with many long stamens; but those in the circuit, instead of stamens have oblong, beautiful, golden leaflets, much wider and handsomer than the true petals, which are small

and of a greenish colour. These double flowers are barren; but the single ones are succeeded by flat, smooth, two-valved legumes, containing several black, shining, compressed seeds. It is a native of La Vera Cruz.

The second species has trailing herbaceous stalks, putting out roots at every joint, and spreading to a considerable distance. A single plant, in the stove, in one summer, has spread near three feet square, and the branches so closely joined, as to cover the surface of the bed; but when permitted to grow thus, the plants seldom produce flowers: the leaflets are narrow, and the petioles are short and smooth: the flowers axillary, on naked peduncles about an inch in length; they are of a pale yellowish colour, and are collected into small globular heads: the legumes short, flat, jointed, containing three or four compressed, roundish seeds. It is a native of Jamaica.

The third has a creeping root: the stalks slender, having four acute angles, armed pretty closely with short recurved spines: the leaves on long prickly foot-stalks, and thinly placed on the branches: the wings two pairs, about an inch asunder, short: the leaflets narrow, not very close: the peduncles axillary, sustaining a small globular head of purple flowers: the legumes four-cornered, two inches long, four-celled, four-valved; containing several angular seeds in each cell. It was found at La Vera Cruz.

The fourth species rises with a slender woody stalk, seven or eight feet high, armed with short recurved thorns: the leaves grow upon long foot-stalks which are prickly, each sustaining two pairs of wings; the outer pair has two lobes which join at their base, and are rounded on the outside, but straight on the inner edges, shaped like a pair of sheep-shears; they are much larger than the inner, are almost two inches long, and one inch broad in the middle: from the place where these are inserted into the stalk, come out small branches, which have three or four globular heads of pale purplish flowers coming out from the side, on short peduncles; and the principal stalk has many of those heads of flowers on the upper part for more than a foot in length; and this, as also the branches, is terminated by similar heads of flowers: the pods are broad, flat, jointed, opening by two valves, containing one, two, or three compressed orbicular seeds: the leaves move but slowly when touched, but the foot-stalks fall when they are pressed very hard. It is a native of Brazil.

The fifth has the roots composed of many hairy fibres, which sit close together, from which come out several woody stalks, which decline towards the ground, unless they are supported; they are armed with short recurved spines, and have winged or pinnate leaves, composed of four, and sometimes five pinnas, whose bases join at a point, where they are inserted into the foot-stalk, spreading upwards like the fingers of a hand: the flowers from the axils, on short peduncles, collected in small globular heads, of a yellow colour: the pods short, flat, jointed, in close clusters, almost covered with stinging hairy covers. It is a native of Brazil.

The sixth species has the spike roundish, nodding: the flowers ten-stamened, and yellow; the lower ones of the spike without stamens or petals. It is a native of the West Indies, flowering in July and August.

The seventh rises with upright branching stalks six or seven feet high, becoming woody towards the root, with callous dots dispersed upon it, but not perennial (at least they are not so here in any situation, the plants always decaying in winter); they are smooth, and the leaves are composed of four or five pairs of long winged lobes, which have about twenty pairs of small leaves ranged along the midrib; are smooth and rounded at their points, of a full green on their upper side, but pale on their under: these small leaves contract themselves together on their being touched, but the foot-stalks do not decline at the same time, as those do which are titled Humble Plants: it is therefore called the Sensitive Plant by way of distinction: the flowers are produced upon long foot-stalks, which come out from the wings of the leaves, and are disposed in globular heads which nod downward, are yellow; and all those which have petals have ten stamina in each, but those situated round the border have neither petals nor stamina; those on the upper part of the spike are succeeded by pods an inch and a half long, and a quarter of an inch broad, which change to a dark brown when ripe, inclosing three or four compressed, shining, black seeds. It is probably a native of America.

The eighth species has the stems seldom more than two feet and a half high, and smooth: the leaves are composed of three or four pinnas, which are shorter, and the leaflets much narrower than in the first and seventh sorts: the heads of the flowers are smaller, being made up of many long white filaments, forming altogether a round head, and the pods longer and narrower, an inch long, and a quarter of an inch broad, with a round protuberance at each seed. It grows naturally in all the islands of the West Indies, where it has its name from the leaves not contracting on being touched.

The ninth species has a shrubby erect stalk about five feet high, hairy and armed with short, broad, strong thorns, which are white, standing on each side, almost opposite, or alternate: the leaves five- or six-paired, with a strong midrib, and between each pair two short strong spines, pointing out each way: the leaflets extremely narrow and very close: towards the upper part of the stalk the flowers are produced from the sides on short peduncles; they are collected into globular heads, and are of a bright purple colour: the stalks are also terminated by smaller heads of the like flowers: the pods flat, jointed, about two inches long, and a quarter of an inch broad, spreading like rays, there being commonly five or six joined together at the base: they separate at each articulation, leaving the two side membranes or borders standing: the seeds, which are compressed and square, drop out from the joints of the pods, which are hairy at first, but as they ripen become smooth: the petioles do not fall on being touched, but the leaflets close up. It is a native of La Vera Cruz.

The tenth has the stem recurved, prickles scattered over it in pairs: the leaves commonly six-paired, with many paired pinnas: on the universal petioles there are recurved prickles between each of the partial ones; and there is a straight upright prickle which is longer, between each pair of the partial ones, in place of a gland: the heads are globular: the legumes membranaceous-compressed, jointed, rugged. It is a native of South America.

The eleventh species has the spikes globular, large, peduncled: the flowers white, apetalous, ten-stamened: the legumes long, flat. It flowers in April, and the seeds ripen in autumn; found at La Vera Cruz.

The twelfth is a tree which seldom exceeds twelve feet in height: it has numerous branches forming a pyramidal figure: the leaves are small; the flowers are small, yellow, and void of scent, in a close cylindrical spike, an inch and a half long: the legumes coriaceous, containing a buttery pulp, in which the seeds are rolled up: the spines are very singular, subaxillary and connate at the base, resembling the horns of oxen; brown, shining, hollow, and the longest more than five inches in length; they are all over the tree; and when the pods are ripe and the leaves fallen, they have a singular appearance. It is a native of Carthagena, flowering in June and July, and ripening seeds in September.

The thirteenth species has the branches angular, smooth, with a brown bark: the leaves sometimes two from the axil of the spines: partial four- or five-paired, inner shorter, with leaflets from five- to seven-paired, outer eight-to eleven-paired: leaflets linear, acute, smooth: the spines in pairs white, purple at the tip: the flowers in a globular head, axillary and solitary, first sessile, then peduncled, shorter than the leaves: the legumes compressed, and attenuated at the base. It is a native of the East and West Indies, &c.

The fourteenth has the flowers many-stamened, very fragrant, yellow, in sessile heads: the petioles have a gland below the leaflets: the legumes are fusiform. On account of the sweetness of its flowers, it has been dispersed through most parts of Europe. It is brought by the Italian gardeners, who bring over Orange-trees, &c. in young plants, under the name of *Gazia*. It is a native of Saint Domingo, flowering from June to August.

The fifteenth species is a tree which arrives at a large size in countries where it grows naturally, but in this climate is rarely seen more than eight or ten feet high: it has the habit of the fourteenth sort; differing in having no callous dots upon the branches: the bark is purple: the spines in pairs, and longer than those of the fourteenth: the branches purple, even: the partial leaves about five pairs; between two pairs of the outer ones a gland is inserted into the common petiole: the legumes necklace-shaped, compressed: the joints roundish-rhomb-shaped: flowers many-stamened, in peduncled heads. It is a native of Egypt and Arabia. It is the tree which yields the Gum Arabic.

The sixteenth has leaves simple, linear, and pungent or hard and prickly at the end, and growing in whorls six or seven together; but it has dissimilar leaves, and the primordial ones, or two or three first leaves which appear on the seedling plants, are bipinnate. It is a native of New South Wales; flowering from March to May.

According to Mr. Curtis, it is some years in arriving at its flowering state.

The seventeenth is a lofty tree, with an upright smooth trunk, covered with an ash-coloured bark: the branches diverging, bent down, smooth: the partial leaves twelve-paired: the universal petiole round, striated, ferruginous-pubescent: partial petioles also ferruginous: the glands roundish, concave, between the petioles: the scalelets bifid, minute, at the base of the partial petioles: pinnas sixteen- or eighteen-paired, halved, subsessile, acute, entire, smooth: the spikes peduncled, subglobular, composed of aggregate, sessile, white flowers: the peduncles axillary, and slender: the seeds spherical, shining black. It is a native of Jamaica, where it is called *Mountain or Wild Tamarind Tree.*

Painted by Syd. Edwards
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Engraved by F. Sansom

1 *Mirabilis jalapa* Marvel of Peru

2 *Mimosa sensitiva* Sensitive Plant

3 *Monarda didyma* Scarlet Monarda

The eighteenth has the leaves destitute of glands: the pinnas from twelve to twenty, an inch in length: the bundles of flowers peduncled: the legume a span long. It is cultivated in the gardens at Cairo, where it flowers in June, and becomes a large tree. It is probably a native of Egypt.

The nineteenth has the bracteas half-cordate: the peduncles in threes: the flowers in heads: an obsolete gland on the common petiole below the partial pinnas: the germs are globular, two-valved; with two roundish, concave or hemispherical leaflets: the leaves very smooth. It is a native of the West Indies, flowering most part of the summer.

The twentieth species has the branches with few recurved prickles: the leaves four- or five-paired: a gland between the lowest partial ones, which are twelve-paired, but the lowest pinnule wants the opposite on the inside: on the common petiole are two remote prickles, underneath between each partial one: the stipules wide, acuminate, purple: the legumes very wide. It is a native of America.

In the twenty-first, the leaves divide into many ramifications: the leaflets are roundish, and placed in a very regular order: the seeds, which are flat, and one half of a beautiful red colour, the other half of a deep black, grow in long twisted pods, and hanging by a small thread for some time out of the pod, when they are ripe, make a very agreeable appearance. It was brought from the Bahama Islands.

The twenty-second species is frutescent, being a large procumbent branching shrub: the panicle very much branched, naked, terminating the stem and branches: the prickles small, scattered over the stem and panicle: the leaves having from twelve to twenty pairs of partial leaves, with an oblong melliferous pore at the base of the general petiole: the leaflets linear and almost capillary: there are no prickles on the petioles or peduncles, but a gland above the base of the petioles: the flowers white, polygamous, in a vast diffused terminating panicle, of very many small globular heads. It is a native of the East Indies.

The bark is there converted into a sort of tow, which is used for stopping cracks both in houses and boats.

The twenty-third sort has the flowers many-stamened, sessile: the leaves are like those of the Walnut; and the flowers are purple. It is a native of South America.

The twenty-fourth has also purple flowers, and is a native of South America.

The twenty-fifth is a tree with rigid branches, that are flexuose from bud to bud: under each bud is a pair of horizontal, whitish, stipular thorns, the length of the leaves: the leaves are petioled, conjugate, or one-paired, with pinnate, six-paired leaflets: the common petiole terminated above by a gland, beneath by a prickle: the leaflets oblong-linear, blunt, at equal distances, the lowest smaller: the legume oval, a hand in length and half as much in breadth, compressed, with large scattered seeds. It is a native of the Cape.

The twenty-sixth climbs to the tops of the tallest trees, to the height of one hundred and fifty feet, frequently overspreading many of the neighbouring branches, and forming large arbours: the withs are slender, but tough and flexile, striated, stiff, and smooth: common petioles long, opposite, thickened at the base, round, very smooth, terminating in a tendril, by which the branches are supported: the pinnas four-paired, petioled, oblong, blunt at top, emarginate, nerved, smooth on both sides, shining: the glands none: the tendril long, upright, bifid at the end: the spikes axillary, erect, very long, many-flowered: the flowers approximating, subsessile, small: most of them are abortive: and according to Browne, the female plants throw out their flowers separate, and are succeeded by so many pods. It is a native of both Indies, and in the West Indies is called *Cocoon*.

The twenty-seventh species is in height three or four feet: the branches alternate, upright, angular, with a very tough smooth bark: the leaves of the young seedlings in pairs and pinnated, with oval leaflets: but when the stem rises, the common footstalks of its leaves become dilated, the leaflets cease to appear, and the whole shrub is furnished only with such dilated naked footstalks, which are to all intents and purposes leaves; they are alternate, vertical, smooth, firm and glaucous: the stipules none: on their upper edge near the base a small concave gland: the racemes are axillary, solitary, erect, of about six alternate heads, each having three or four small white flowers: the pod linear, pointed, zigzag, brown, with a very thick margin: the seeds about six, oblong: the flowers on the young branches are very numerous, and fragrant, like those of Spiræa Ulmaria. It is a native of New South Wales.

It produces ripe pods, and perfects seeds in the stove, but in the green-house the flowers go off without any tendency to produce fruit. It is a shrub of quick growth, and which blows very readily.

According to Mr. Curtis, the foliage is usually edged with red.

In the twenty-eighth the branches are most

acutely triangular, and much compressed; their edges bright red: the leaves alternate, four or five inches long, with a rib and margin like the last: the flowers in axillary racemes, yellowish white, fragrant: the petals four: stamens numerous: the young capsules smooth and glaucous. It is a native of New South Wales.

Culture.—They are all capable of being increased by seed, and some of the sensitive kinds by layers and cuttings, but the first is by much the best method.

The seed, procured from the nurseries or seed-shops, should be sown in pots of light rich mould early in the spring, covering it in with fine earth a quarter of an inch deep, and plunging the pots in the hot-bed; if in a common hot-bed under frames and glasses, managing them nearly in the manner of tender annuals, and when in a bark-bed in the stove, little trouble is required. But moderate sprinklings of water should be given; and when the plants are two or three inches high, they should be planted out singly into small pots, preserving the earth to their roots, replunging them in the hot-bed, &c., giving water and occasional shade till they are well rooted, repeating the waterings frequently. The plants thould afterwards be continued either in the hot-bed under glasses, or plunged in the bark-bed of the stove, to facilitate their growth, preserve them in vigour, and increase the sensibility of the Sensitive kinds; admitting fresh air pretty freely.

The perennial sorts, both shrubby and herbaceous, must be kept in the stove all winter, and principally the year round.

And they must be frequently removed into larger pots to prevent the roots from getting through the pots, which they are apt to do, and by that means are often destroyed.

The Acacia kinds are the most tender, requiring the stove almost constantly, except a little in the heat of summer, when they must be placed in a warm situation.

They should always have a bark hot-bed, and be put in very small pots filled with sandy mould, the heat of the stove being kept up to above temperate: as the leaves of some of them are shed, they have often the appearance of being dried when that is not the case.

Where there is not the convenience of a stove, those who are curious to have the plants, may have them in summer, by the aid of a common dung or tan-bark hot-bed under frames and glasses, though not in winter; by raising some of the annual, or any of the other kinds, by seed in spring, in a hot-bed under a frame, &c. keeping up the heat of the bed until the middle of June, and continuing the plants always under the frame, raising one end of the lights a little, occasionally, in warm days to admit fresh air; and as they rise in height, raise the frame at bottom, to allow them full room to grow. About Midsummer, or soon after, some of the low spreading kinds may likewise be turned out with balls, or plunged in their pots into a warm sunny border, and covered with large hand-glasses, which may be lifted off occasionally just to view the plants. By these methods the plants may be preserved through the summer in their sensitive quality, though not equal in perfection to those in stoves; nor can they be preserved alive in winter out of the stove.

The shrubby kinds that afford spreading branches may be layed any time in summer, in pots plunged in the bark-bed, where they then take root, and are ready to pot off singly in the autumn season.

The Sensitive and Humble sorts often branch out profusely, so as to furnish plenty of young shoots for cuttings, which should be planted in pots in the summer season, plunging them in the bark-bed, where they often readily take root, and form good plants.

These modes should, however, only be practised when seed cannot be procured.

The general culture of all the species is afterwards to keep them always in pots placed in the stove, being plunged occasionally in the bark-bed, especially the Spreading Sensitive kinds, frequent waterings being given in summer and winter, but considerably the most in the summer season; shifting them into larger pots as they increase in growth. And although most of the sorts will live in the open air in the heat of summer, it is the best practice to expose them but sparingly.

The fourth and fifth sorts are held in high estimation on account of the singular sensibility lodged in their leaves; which, in consequence of being touched or shaken, either by the hand, a stick, or the least wind blowing upon them, the wings of the leaves suddenly close, and the foot-stalks fall down.

The periods of time which the leaves, &c. require to recover themselves, after falling from any irritation, are according to the vigour of the plant, the hour of the day, the sereneness of the atmosphere, and the temperature of the heat of the stove, &c. being often from ten or fifteen minutes to an hour or more.

The plants also every evening naturally contract themselves, and expand again in the morning. They are all ornamental and curious.

MIMULUS, a genus containing a plant of the herbaceous flowery ornamental kind.

It belongs to the class and order *Didynamia*

Angiospermia, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a one-leafed perianthium, oblong, prismatic, five-cornered, five-folded, five-toothed, equal, permanent: the corolla is one-petalled, ringent: tube the length of the calyx: border two-lipped: upper lip upright, bifid, rounded, bent back at the sides: lower lip wider, trifid, with the segments rounded; the middle one smaller: palate convex, bifid, protruded from the base of the lip: the stamina have four filaments, filiform, within the throat; two shorter: anthers bifid-kidney-form: the pistillum is a conical germ: style filiform, the length of the stamens: stigma ovate, bifid, compressed: the pericarpium is an oval, two-celled capsule, opening transversely at top: partition membranaceous, contrary to the valves: the seeds very many, and small: the receptacle oblong, fastened on each side to the partition.

The species cultivated are: 1. *M. ringens*, Oblong-leaved Monkey-flower; 2. *M. alatus*, Wing-stalked Mimulus; 3. *M. aurantiacus*, Orange Monkey-flower.

The first has a perennial root: the stalk is annual, square, a foot and half high, with two oblong smooth leaves at each joint, broadest at their base, where they join round the stalk, but ending in acute points: the lower part of the stalk sends out two or three short branches, and the upper part is adorned with two flowers at each point, from the bosom of the leaves on each side; they are of a violet colour, and have no scent. It is a native of Virginia and Canada, flowering in July and August.

The second species has the appearance of the first sort: the stem is winged with four membranes running down from the base of the petioles, simple, smooth, with a branchlet or two at top: the leaves are two inches long, veined, unequally serrate: the peduncles axillary, solitary, opposite, four-cornered, thickened at top. It is a native of North America, flowering in July and August.

The third has the stalk about three feet high, much branched, shrubby, round, the young wood green, with a tinge of purple towards the lower part of each joint, slightly viscid, as it becomes older changing to a light-brown colour, and discovering manifest fissures: the branches alternately opposite, flower-bearing quite to the base: the leaves are opposite, sessile, slightly connate, the bluntness at the end particularly apparent when contrasted with a leaf of the first sort, toothed or slightly serrate, smooth, veiny: the flowers inodorous, large, nearly twice the size of those of the first sort, uniformly pale orange, growing in pairs from the axils of the leaves, on peduncles that are about half the length of the calyx. It flowers during most of the summer.

Culture.—This plant is very hardy in respect to cold, but should have a loamy soft soil; rather moist than dry, and not too much exposed to the sun.

The first sort may be increased by parting the roots not too small, and planting them in autumn, or the early spring, but the former is the better season. It may also be raised by seeds, which should be sown in autumn, soon after they become perfectly ripe, on a border exposed to the morning sun.

The third sort may likewise be increased in the same manner.

The fourth kind is best propagated by planting cuttings of the young shoots or branches in the early spring in pots of fresh mould, plunging them in a mild hot-bed, being afterwards managed as the other sorts.

The first is capable of bearing cold when planted in a loamy, soft, rather moist soil, not too much exposed to the sun.

This and the second sort may be introduced in the borders and clumps, and the third among other potted plants of the less tender kinds.

MINT. See MENTHA.

MIRABILIS, a genus furnishing plants of the flowery perennial kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Nyctagines*.

The characters are: that the calyx has the outer perianthium one-leafed, erect-ventricose, inferior, five-parted: segments ovate-lanceolate, sharp, unequal, permanent: inner globular placed under the petal, with a contracted entire mouth, and permanent: the corolla is one-petalled, funnel-form: the tube slender, long, thicker at top, placed on the inner calyx: border from upright spreading, entire, bluntly five-cleft, plaited: nectary spherical, fleshy, surrounding the germ, with a five-toothed mouth: teeth very small, triangular, converging: the stamina have five filaments inserted into the orifice of the nectary, and alternate with its teeth, within the inner calyx free, more slender, fastened at bottom to the tube of the corolla, filiform, the length of the corolla, inclining, unequal: anthers twin, roundish, rising: the pistillum is a turbinate germ, within the nectary: style filiform, the length and situation of the stamens: stigma globular, dotted, rising: there is no pericarpium: the inner calyx incrusts the seed and falls with it: the seed single, ovate-five-cornered.

The species cultivated are: 1. *M. jalapa*, Common Marvel of Peru; 2. *M. dichotoma*,

Forked Marvel of Peru; 3. *M. longiflora*, Sweet-scented Marvel of Peru.

The first has a thick fleshy root: the stem thick, upright, much branched, and divided three feet or more in height: the leaves are broad, oblong, and opposite: flowers terminating, about six, in clusters close together without any leaflets between them, and not longer than the leaf. It is perennial, and a native of both the Indies, flowering from July to October.

There are several varieties in the colour of the flowers, as purple or red, white, yellow, variegated purple and white, and variegated purple and yellow, but which resolve themselves into two principal varieties; as with purple and white flowers, which are variable; some being plain purple, others plain white, but most of them variegated with the two colours, and all found occasionally on the same plant; and with red and yellow flowers, generally mixed, but sometimes distinct on the same plant; some plants having only plain flowers, others only variegated, and others again both plain and variegated: but the plants which are raised from seeds of the purple and white never produce red and yellow flowers, or the contrary.

All these varieties are highly ornamental during the months of July, August, and September, and, when the season continues mild, often last till near the end of October. The flowers opening only towards the evening, while the weather continues warm, but in moderate cool weather, when the sun is obscured, they continue open almost the whole day, and are produced so plentifully at the ends of the branches, that when expanded the plants seem entirely covered with them, and from some being plain, others variegated, on the same plant, have a fine appearance.

The second species resembles the first sort very much: the stalks have thick swollen joints: the leaves are smaller: the flowers not much more than half the size, and do not vary in their colour from their natural purplish red: the fruit is very rough. It is a native of Mexico; and common in the West Indies, where it is termed the *Four o'Clock Flower*, from the circumstance of the flowers opening at that time of the day.

In the third, the stalks fall on the ground, if not supported; they grow about three feet in length, and divide into several branches; are hairy and clammy: the flowers come out at the ends of the branches, are white, have very long slender tubes, and a faint musky odour, as in the other sorts; are shut during the day, and expand as the sun declines: the seeds are larger than those of the other species, and as rough as those of the second sort. It is a native of Mexico, flowering from June till September.

Culture.—In all the sorts the propagation is effected by sowing the seed in the spring season, either on a warm border or in a hot-bed; but the latter method produces the plants considerably more early, and in the greatest perfection

When cultivated on warm south borders, in the places where the plants are to remain, the seed should be sown about the middle of April, either in patches or in shallow drills, half an inch deep, and six inches asunder: and when the places can be covered with hand-glasses, or a frame and lights, or the seed be sown in pots under those protections, or any other occasional shelter during the night-time and in cold weather, it will greatly forward the germination of the seed, as well as the growth of the young plants afterwards. In the latter method, about June, the plants will be fit to plant out into the borders or into pots. Moist weather should be chosen for this purpose, and water and occasional shade be given till well rooted: they then readily grow, and acquire a tolerable size; but they do not attain to a large size, or flower so early by a month or six weeks as those forwarded in the hot-bed.

In the latter method, a hot-bed should be prepared in March, or early in April, under frame and lights, and earthed over about six inches deep; then sowing the seed in the earth of the bed in shallow drills half an inch deep, as directed above, or in pots of rich earth the same depth, plunging them in the earth of the bed. The latter is the better method. The plants soon rise; when they should have fresh air daily, in common with the other plants of the bed, and frequent refreshings of water; and when nearly two inches high, be planted out into another fresh hot-bed to forward them, placing them either in the earth of the bed, four or five inches asunder, or singly in small pots (thirty-twos), plunging them in the bed; water and shade should be immediately given till fresh-rooted, continuing the care of admitting fresh air every mild day; and about the middle or latter end of May, when they have acquired a good size and strength, they should be inured by degrees to the full air, so as that they may be removed into it fully about the beginning of June, choosing mild cloudy moist weather, if possible, for the business; taking up such as grow in the beds, with balls of earth about their roots, and planting them in the borders; but those in pots may be turned out with the whole ball entire, and planted in that way. Some should also be removed into large pots for moving into particular situations. Water should be directly given, and occasional shade to such as

require it, repeating the waterings to the whole, till they have struck fresh root and begun to grow, when they will not require any further culture, except the occasional support of sticks, which is most necessary in the last sort.

As the seed ripens well, it will frequently prevent the trouble of preserving the roots.

But when these are taken out of the ground in autumn, and laid in dry sand during the winter, secure from frost, and planted again in the spring, they grow much larger and flower earlier than the seedling plants: or when the roots are covered in winter with tanner's bark to keep out the frost, they often remain secure in the borders, where the soil is dry. When the roots thus taken out of the ground are planted the following spring in large pots, and plunged into a hot-bed, under a deep frame, they may be brought forward, and raised to the height of four or five feet, and flower much earlier in the season.

In collecting the seeds, care should be taken not to save any from the plants which have plain flowers; and in order to have variegated flowers, the plain flowers should be pulled off from those plants which are intended to stand for seed.

As the second sort is less hardy than the first and third, unless the plants are brought forward in the spring they seldom flower till very late, and their seeds do not ripen perfectly.

All the sorts are proper for the principal borders of pleasure-grounds, being very ornamental in their large branchy growth, as well as in their extensive flowering.

The root of all the sorts is a strong purgative.

MOLUCCA BAUM. See MOLUCCELLA.

MOLUCCELLA, a genus containing plants of the herbaceous annual exotic kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leafed perianthium, very large, turbinate, gradually finishing in a very wide, bell-shaped, tooth-spiny, incurved, permanent border: the corolla is one-petalled, ringent, less than the calyx: tube and throat short: upper lip upright, concave, entire; lower lip trifid: the middle segment more produced, emarginate: the stamina have four filaments, under the upper lip, of which two are shorter: anthers simple: the pistillum is a four-parted germ: style the size and situation of the stamens: stigma bifid: there is no pericarpium: fruit turbinate, truncate, in the bottom of the open calyx: the seeds four, convex on one side, angular on the other, at top wide and truncate.

The species cultivated are: 1. *M. lævis*, Smooth Molucca Baum; 2. *M. spinosa*, Prickly Molucca Baum.

The first has an annual root: the stem three feet high, spreading out into many branches, which are smooth, and come out by pairs: the leaves are roundish, deeply notched on their edges, opposite, on long petioles, smooth, light green on both sides: at the base of the petioles the flowers come out in whorls: immediately under the calyx also come out two bunches of pretty long spines, one on each side, each bunch consisting of five or six spines arising from the same point: the corolla is small, and being placed at the bottom of the large calyx is not visible at a distance; it is white with a cast of purple. It is a native of Syria, flowering in July and August.

In the second the root is also annual: the stems smooth, purplish, four feet high, branching out in the same manner with the first: the leaves are smaller, on shorter foot-stalks, deeper and more acutely indented on their edges: the calyx not so large, and cut into eight segments, each terminated by an acute spine: the flowers like those of the first sort. It is a native of the Levant, flowering in July and August.

Culture.—These plants may be increased by sowing the seeds in the early autumn on a mild hot-bed, or in pots plunged into it, and when the plants have attained a little growth be planted in small pots, and placed under a hot-bed frame in winter, where they may have free air in mild weather by taking off the glasses, being carefully covered in frosty weather, keeping them pretty dry, otherwise they are apt to rot. In the spring the plants may be turned out of the pots, with their earth about their roots, and planted in a warm border, defended from strong winds, giving them a little water to settle the earth to their roots; after which they require no other care but to be kept clean from weeds, and be supported with stakes.

They afford ornament and variety in the borders among other tender annuals.

MOLY. See ALLIUM.

MOMORDICA, a genus furnishing plants of the annual trailing and perennial kinds.

It belongs to the class and order *Monoecia Syngenesia*, and ranks in the natural order of *Cucurbitaceæ*.

The characters are: that in the male flowers the calyx is a one-leafed perianthium, concave, five-cleft: segments lanceolate, spreading: the corolla five-parted, fastened to the calyx, more spreading, large, veined, wrinkled: the stamina have three awl-shaped filaments, short: anthers on two filaments bifid, eared at the sides; on the third simple, one-eared only, consisting of a compressed

body and a fariniferous line once reflex: female flowers on the same plant: the calyx is a perianthium as in the male, superior, deciduous: the corolla as in the male: the stamina have three filaments, very short, without anthers: the pistillum is an inferior germ, large: style single, round, trifid, columnar: stigmas three, gibbous, oblong, pointing outwards: the pericarpium is a dry, oblong pome, opening elastically, three-celled: cells membranaceous, soft, distant: the seeds several, and compressed.

The species cultivated are: 1. *M. balsamina*, Common Momordica, or Male Balsam Apple; 2. *M. charantia*, Hairy Momordica; 3. *M. Luffa*, Egyptian Momordica; 4. *M. elaterium*, Elastic Momordica.

The first has a trailing stem, like those of the Cucumber and Melon, extending three or four feet in length, and sending out many side branches which have tendrils: the leaves are shaped like those of the Vine, smooth, deeply cut into several segments, and spreading open like the hand. According to Martyn, the fruit is fleshy, ovate, drawn to a point at each end, obscurely angular, remotely tubercled in longitudinal rows, smooth in the other parts, red when ripe, one-celled, inflated, bursting irregularly, and dispersing the seeds, which are ovate and pale brown, with a spring. It is a native of India, flowering in June and July.

The second species has a round, slender, branched stem, climbing by lateral tendrils: the leaves are sinuate-palmate, wrinkled, smooth, toothed, spread out into a ring, having the nerves pubescent; they are alternate and petioled: the flowers are sometimes hermaphrodite, on long, axillary, one-flowered peduncles, of a yellow or orange colour: the fruit oblong, bluntly angular, tubercled, drawn to a point at each end, white, yellow, or green on the outside; within very red and fleshy, one-celled; it bursts elastically: the seeds ovate, flat, bitten at the edge. It is a native of the East Indies, flowering in June and July. It varies, according to some, with short pointed fruit.

The third has an angular, very much branched stem, climbing by bifid spiral tendrils: the leaves having five or seven sharp angles, the middle one double the length of the others, unequally serrate, veined, wrinkled, on long alternate petioles: the male flowers are several together, terminating: the females lateral, and solitary: the pome a foot long, two inches thick, roundish, usually drawn to a point at each end, hairy, three-celled, with a white, flaccid, esculent pulp, of an insipid flavour: the seeds are oblong, compressed, and smooth. It is a native of the East Indies, flowering in July and August.

The fourth species has a large fleshy perennial root, somewhat like that of Bryony: the stems thick, rough, trailing, dividing into many branches, and extending every way two or three feet: the leaves are thick, rough, almost heart-shaped, gray, on long foot-stalks: the flowers axillary, much less than those of the common Cucumber, of a pale yellow colour, with a greenish bottom: the male flowers stand on short thick peduncles; but the female flowers sit on the top of the young fruit, which grows to an inch and half in length, swelling like a Cucumber, of a gray colour like the leaves, and covered with short prickles: the fruit does not change its colour, but when ripe quits the peduncle, and casts out the seeds and juice with great violence. It is a native of the South of Europe.

When the fruit is designed for medicinal use, it should be gathered before it is ripe, otherwise the greatest part of the juice, which is the only valuable part, is lost, as the expressed juice is not to be compared with that which runs out of itself; and the elaterium made from the clear juice is whiter, and keeps much longer than that which is extracted by means of pressure. All the parts of the plant are bitter, and strongly purgative.

Culture.—All these plants may be increased by sowing the seeds in the first three sorts upon a moderate hot-bed in the early spring months, as about March; and when the plants have had a little growth, let them be pricked out into another hot-bed, fresh air being given in fine weather, and water occasionally; or they may be let remain in the first hot-bed till they have acquired sufficient growth, and have four or five leaves, when they should be removed into the hot-bed where they are to remain, one or two plants being put into each light, due shade and water being given till fresh rooted. They afterwards demand the same management as the Cucumber kind, the branches being suffered to extend themselves in the same manner. When thus managed and properly treated in respect to air and water, they produce fruit and ripe seeds in the latter end of summer, when it must be immediately gathered to prevent its being dispersed.

The plants may likewise be set in pots, and placed in the hot-house, their vines or stems being supported by sticks, in which mode they have a much better appearance and effect.

The fourth sort may be sown or suffered to scatter, where the plants are to remain, or on beds of fine mould in the autumn; the plants being afterwards thinned out or removed into rows in an open situation, three or four feet apart, and as many distant in them, requiring only the

further culture of being kept clean from weeds. When the soil is dry, they often continue three or four years.

All the sorts afford ornament, the first three sorts in the stove, and the last in the open borders. The fruit of the last also affords a medicinal substance by inspissation.

MONARDA, a genus containing plants of the fibrous-rooted herbaceous flowery biennial and perennial kinds.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leafed tubular perianthium, cylindric, striated, with a five-toothed equal mouth, permanent: the corolla unequal: tube cylindric, longer than the calyx: border ringent: upper lip straight, narrow, linear, entire; lower lip reflex, broader, trifid; middle segment longer, narrower, emarginate; lateral blunt: the stamina have two bristle-shaped filaments, the length of the upper lip, in which they are involved: anthers compressed, truncate at top, convex below, erect: the pistillum is a four-cleft germ: style filiform, involved with the stamens: stigma bifid, acute: there is no pericarpium: calyx containing the seeds at the bottom: the seeds four, roundish.

The species cultivated are: 1. *M. fistulosa*, Purple Monarda; 2. *M. oblongata*, Long-leaved Monarda; 3. *M. didyma*, Scarlet Monarda, or Oswego Tea; 4. *M. rugosa*, White Monarda; 5. *M. punctata*, Spotted Monarda.

The first has a perennial root, composed of many strong fibres, and spreading far on every side: the stems, near three feet high, are hairy and obtuse-angled; they send out two or four small side branches towards the top: the leaves oblong, broad at the base, but terminating in acute points, hairy, a little indented on their edges, on short hairy foot-stalks: the stem and branches terminating by heads of purple flowers, which have a long involucre, composed of five acute-pointed leaves. It is a native of Canada, flowering from June to August.

The second species differs from the first, in having the leaves ovate at the base, and a little attenuated, and more villose underneath. It is a native of North America, flowering from July to September.

The third has a perennial root: the stems about two feet high, smooth, acute-angled: the leaves indented on the edges, on very short foot-stalks; when bruised they emit a very grateful refreshing odour: towards the top of the plant come out two or four small side branches, with smaller leaves of the same shape: the flowers are produced in large heads or whorls at the top of the stalk, and there is often a smaller whorl at a joint below the head; and out of the head arises a naked peduncle, sustaining a small head or whorl: the flowers are of a bright red colour. They come out in July; and in a moist season, or when the plants grow in a moist soil, they continue till the middle or end of September. It is a native of North America.

The fourth species resembles the following, but the leaves are longer, smooth, wrinkled a little like those of Sage, and the flowers white. It is a native of North America, flowering from July to September.

The fifth has stems about two feet high, branching out from the bottom to the top: the leaves lanceolate, coming out in clusters at each joint, where there are two larger leaves, and several smaller ones on each side; the larger leaves are two inches and a half long, three quarters of an inch broad, and slightly indented on their edges: towards the upper part of the stem the flowers come out in large whorls, with an involucre to each whorl composed of ten or twelve small lanceolate leaves, of a purplish red colour on their upper side (four larger, and four smaller, besides the leaves of the whorls): the flowers are pretty large, of a dirty yellow colour spotted with purple. It is a biennial plant; and a native of Maryland and Virginia, flowering here from June to October.

Culture.—All these plants may be increased by parting the roots, and some of them by slips and cuttings as well as seeds.

As the first sort does not increase fast by the roots, the seeds may be sown in the autumn on a bed of good earth, and in the following summer the plants be removed into nursery rows half a foot apart, in a rather shady situation, and in the beginning of the following autumn set out where they are to remain and flower. They succeed best in a soft loamy soil not too much exposed.

The roots should be divided either in the autumn or very early spring, but the former is the better, being afterwards either planted out in rows to remain till they are strong, or, when strong, at once where they are to remain.

Strong slips or cuttings of the branches may be taken off in the beginning of summer, and planted out in a shady border, due shade and water being given till well rooted, when in the autumn they may be removed to where they are to remain.

The third sort succeeds best in a light soil, in an eastern situation.

They all afford ornament in the borders and clumps of pleasure-grounds.

MONKEY-FLOWER. See MIMULUS.
MONKEY'S-BREAD. See ADANSONIA.
MONK'S-HOOD. See ACONITUM.
MONK'S-RHUBARB. See RUMEX.

MONSONIA, a genus containing plants of the herbaceous under-shrubby biennial and perennial kinds, for the green-house.

It belongs to the class and order *Monadelphia Dodecandria*, and ranks in the natural order of *Gruinales*.

The characters are: that the calyx is a five-leaved perianthium: leaflets lanceolate, awned, equal, permanent: the corolla has five petals, obovate, præmorse-toothed, longer than the calyx, inserted into the base of the pitcher of stamens: the stamina have fifteen filaments, united in five bodies, three in each, all connected at the base, and forming a very short pitcher: anthers oblong: the pistillum is a five-cornered short germ: style awl-shaped: stigmas five, oblong: the pericarpium is a five-cornered capsule, five-celled: each cell fixed to a very long, twisted, terminating tail: the seeds solitary.

The species are: 1. *M. speciosa*, Fine-leaved Monsonia; 2. *M. lobata*, Broad-leaved Monsonia; 3. *M. ovata*, Undulated Monsonia.

The first has the radical leaves petioled, several, bipinnate-quinate: leaflets linear, pinnate, pinnas sublanceolate: the scapes two or three, one-flowered, a span high, twice as long as the leaves, having in the middle a small six-leaved involucre, with lanceolate leaflets: the flower handsome: in habit and fructification it bears great affinity to Geranium, but is distinguished from it by having the appearance of Anemone, and by the stamens and style being different.

The second species is very like the preceding, differing in no respect from it, not even in the very singular crown of the germ; but the leaves are simple, bluntly seven-lobed, crenate, blunt, subpubescent (as the whole herb is), entirely resembling those of some sorts of Geranium: the fruit has a beak to it, with a very long point.

The third has the stem herbaceous, columnar, and filiform: the leaves opposite, about equal in length to the foot-stalks, ovate, crenated, about half an inch long, with some hairs: the stipules are two on each side, subulate: the flowers are axillary, on very long foot-stalks, of a whitish yellow colour; about the middle of the length of the foot-stalk are two stipules: the foot-stalk of the flowers is upright: when bearing the fruit it is declinate-erect from the stipules, one-flowered.

All these plants are natives of the Cape; the two first being perennial, flowering in April and May, and the third biennial, flowering in August.

Culture.—The first sort rarely, if ever, ripening seeds in this climate, must be increased by cuttings of the root, which should be planted in pots of good mould, and plunged in a tan-hot-bed, watering them occasionally, when in a little time buds appear on the tops of the cuttings which are left out of the ground. They should be treated as hardy green-house plants, or be afterwards removed into separate pots, and sheltered under a good garden frame in the winter season.

And the second sort should be raised in the same manner.

But the third should be raised from seeds, which must be sown in the early spring in pots of light earth, and plunged in a mild hot-bed. When the plants are come up, they should be removed into other pots separately, and be managed as the other kinds.

They afford variety among other potted plants.

MOON TREFOIL. See MEDICAGO.

MORÆA, a genus furnishing plants of the bulbous-tuberous-rooted herbaceous flowering perennial kinds.

It belongs to the class and order *Triandria Monogynia*, and ranks in the natural order of *Ensatæ*.

The characters are: that the calyx has two-valved spathes: the corolla six-petalled: three inner parts spreading; the rest as in Iris: the stamina consist of three short filaments: anthers oblong: the pistillum is an inferior germ: style simple: stigmas three, bifid: the pericarpium is a three-cornered capsule, three-grooved, three-celled: the seeds very many, round.

The species cultivated are: 1. *M. Iriopetala*, Iris-petalled Moræa; 2. *M. Iridioides*, Iris-like Sword-shaped Moræa.

The first sort has two varieties, the first of which has the bulb with the scales connected at the sides a little compressed, but distinct at the base: with ten compressed teeth, and as many alternately shorter: the skin smooth, and dark-coloured: the culm branched: branches three or four: the leaves three or four, awl-shaped, pale-green, from five to seven or eight inches in length, and about half an inch broad, terminating with three angles; the glumes two-valved, subglobular, two-flowered: the flowers are white: the seeds of a reddish rust colour. It is a native of the Cape, flowering in June.

The second has the scales connected at the base, bifid, depressed, but not compressed: the glume two-valved, two-flowered: the flowers two, seldom more than two on a scape: the roots are fibrous, like those of the Hag-leaved

Iris, whence arise many small swordshaped leaves, five or six inches long, and half an inch broad in the middle, diminishing towards both ends, of a deep green colour, lying over each other at the base: the scape about eight inches high, having one small leaf at each joint, and terminated by one flower, covered with a two-valved spathe, of a dirty white, with a blush of purple. It is a native of the Cape, flowering in June, and ripening seeds about the end of July.

The second species has a fibrous root; the scape a span or foot high, roundish or scarcely compressed, jointed, smooth, simple or little branched, upright, the length of the leaves: the leaves ensiform, narrowed at the inner base, nerved, smooth, acuminate, upright: the flowers from the uppermost axils of the leaves, sometimes three, but often only one: the spathe two-valved: the germ pedicelled, subtrigonal, striated: the corolla is six-petalled: the three outer petals obovate, oblong, bearded, spreading, with a yellow spot in the middle: the three inner white without spots, spreading like the outer ones: the seeds numerous, variously angular, depressed, with two flat sides. It is a native of the Cape.

Culture.—These plants are all increased either by seeds, offsets, or parting the roots, which should be performed in August, in all the methods; the seeds being sown in small pots, and plunged into a bed of old tanner's bark, under a common frame. The seed is chiefly sown for the sake of raising new varieties.

The plants also require the shelter of a frame in winter, being apt to draw up weak when placed in the dry stove. Where they can enjoy the free air in winter, when the weather is mild, and be secured from frost and hard rain, they flower and ripen their seeds better than with more tender management. In summer they should be fully exposed to the open air till the approach of autumn, when they should be removed into the shelter of the frame.

They afford variety among other potted plants in the green-house, &c.

MORINA, a genus furnishing plants of the hardy herbaceous flowery perennial kind.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Aggregatæ*.

The characters are: that the calyx is double: the perianthium of the fruit inferior, one-leafed, cylindric, tubular, permanent: mouth toothed: toothlets two, opposite, longer; all subulate, acute: perianthium of the flower superior, one-leafed, tubular, bifid; segments emarginate, blunt, permanent, upright, the size of the outer: the corolla one-petalled, two-lipped: tube very long, widening above, a little curved in, filiform at bottom: border flat, blunt, upper lip semi-bifid, smaller; lower trifid; segments all blunt, uniform, the middle one more lengthened: the stamina have two bristle-shaped filaments, aproximating to the style, parallel, shorter than the border: anthers erect, cordate, distant: the pistillum is a globular germ, under the receptacle of the flower: style longer than the stamens, filiform: stigma headed-peltate, bent in: there is no pericarpium: the seed single, roundish, crowned with the calyx of the flower.

The species is *M. Persica*, The Persian or Oriental Morina.

It has a taper and thick root, running deep into the ground, sending out several thick strong fibres as large as a finger: the stem nearly three feet high, smooth, purplish towards the bottom, but hairy and green at the top: at each joint are three or four prickly leaves, four or five inches long, an inch and half broad, of a lucid geeen on the upper side, but of a pale green and a little hairy underneath, armed on their edges with spines; the flowers axillary on each side, some white and others purplish red on the same plant; appearing in July, but do not produce seed in this climate. According to some it has the odour of Honeysuckle. It is a native of Persia near Ispahan.

Culture.—This is increased by seed or off-sets from the roots.

The seeds should be sown in the autumn in the places where the plants are to grow, as, from their having a strong tap-root, they do not bear shifting well. The ground in the bed or border near them should not be afterwards much disturbed, the plants being only kept clean. They mostly flower in two or three years after being raised.

The off-sets should be slipped from the roots while young, and be planted out where they are to stand, in the latter end of the summer, being afterwards treated as those raised from seed.

They decay to the ground in the autumn, new leaves being sent up in the spring; but the roots continue several years when not stirred, or injured by severe frosts.

They are highly ornamental in the principal beds and borders of pleasure-grounds.

MOROCCO, RED. See ADONIS.

MORUS, a genus containing plants of the deciduous tree kind.

It belongs to the class and order *Monoecia Tetrandria*, and ranks in the natural order of *Scabridæ*.

The characters are: that the male flowers are in an ament: the calyx is a four-parted perianthium: leaflets ovate, concave: there is no corolla: the stamina have four awl-shaped fila-

ments, erect, longer than the calyx, one within each calycine leaf: anthers simple: female flowers heaped either on the same, or a different individual from the males: the calyx a four-leaved perianthium: leaflets roundish, blunt, permanent, the two opposite outer ones incumbent: there is no corolla: the pistillum is a cordate germ: styles two, awl-shaped, long, reflex, rugged: stigmas simple: there is no pericarpium: calyx very large, fleshy, become succulent, like a berry: the seed single, ovate, acute.

The species cultivated are: 1. *M. nigra*, Common Mulberry Tree: 2. *M. alba*, White Mulberry Tree; 3. *M. papyrifera*, Paper Mulberry Tree: 4. *M. rubra*, Red Mulberry Tree; 5. *M. indica*, Indian Mulberry; 6. *M. tinctoria*, Dyer's Mulberry or Fustick-wood.

The first differs from the second sort, according to Linnæus, in having the leaves subquinquelobate, bluntish, and rugged, undivided and shining; the fructification of the second dioecious, of this monœcious. These distinctions are not however exact, as this is a larger, stronger tree; and the fruit is dark blackish red and more acid. According to Miller, it has generally male flowers or catkins on the same tree with the fruit, but it often happens that some of the trees which are raised from seeds have mostly male flowers and produce no fruit; and he has observed some trees which produced only catkins for many years after they were planted, and afterwards have become fruitful. "This," Martyn says, "agrees with a general remark that he has made on monœcious trees, that whilst they are young they bear male flowers chiefly and very little fruit." Trees of this sort of a certain age are not only more fruitful than young ones, but their fruit is much larger and better flavoured. It grows naturally in Persia; whence introduced into Europe.

This is the sort usually cultivated as a fruit-tree in the garden.

There is a variety with palmate or elegantly cut leaves and a smaller fruit.

The second species is a middle-sized tree, with a whitish bark, of which a coarse sort of paper may be made, and spreading branches: the leaves are broad-lanceolate, obliquely cordate, subserrate, undivided, or three-lobed, some cut, smooth, petioled, scattered: the berries lateral, juicy, insipid, pale, oblong. It is a native of China, &c. flowering in June.

Miller observes that there are two or three varieties of this tree, which differ in the shape of their leaves, and in the size and colour of the fruit; but as it is of no other use but for the leaves, the strongest-shooting and the largest-laeved should be preferred.

This sort is commonly cultivated for its leaves to feed silk-worms in France, Italy, &c.; and in Spain, according to Mr. Townsend, they prefer the White Mulberry in Valencia, and the Black in Granada. But the Persians generally make use of the latter; and Mr. Miller was assured by a gentleman who had made trial of both sorts of leaves, that the worms fed with the latter produced much the best silk; but that the leaves of the black should never be given to the worms after they have eaten for some time of the white, lest they should burst. And Sir George Staunton states, that the tender leaves growing on the young shoots of the black sort are supposed in China to be the most succulent or juicy.

The third is a tree which makes very strong vigorous shoots, but seems not to be of tall growth, as it sends out many lateral branches from the root upwards. The leaves are large, some of them entire, others deeply cut into three or five lobes, especially whilst the trees are young; they are dark green and rough to the touch on the upper surface, but pale green and somewhat hairy on the under side, falling off on the first approach of frost in autumn. The fruit is little larger than peas, surrounded with long purple hairs, when ripe changing to a black-purple colour, and full of sweet juice. It is a native of Japan and the South Sea islands.

The fourth species, which is the Virginian Red or Large-leaved Mulberry Tree with black shoots, grows to the height of thirty or forty feet in its native situation, sending forth many large branches. The leaves are not only larger but rougher than those of the common Mulberry, though in other respects they somewhat resemble them. It produces plenty of catkins, in shape like those of the Birch, and it has a dark reddish fruit. It is a native of Virginia and Carolina.

The fifth is a large tree, with a soft, thick, yellowish bark, and a milky juice like the Fig, which is astringent. The branches come out on every side. The leaves are on short footstalks, rough, dark green above, pale underneath, alternate. The flowers in round heads, at the footstalks of the leaves, on each side the branches, of an herbaceous white colour: the fruit roundish, first green, then white, and finally dark red. According to Miller it is a monœcious tree, but Linnæus suspects it to be dioecious. It is a native of the East Indies.

The sixth species is a tall branching tree with a fine head, the whole abounding in a slightly glutinous milk of a sulphureous colour: the timber is yellow, and is used in dyeing: the spines awl-shaped, solitary, few; entire branches are frequently without any: the leaves acuminate, serrate, smooth on both sides, veined, distichous,

on short petioles of various sizes: aments solitary, pendulous, axillary between the petiole and the spine, two or three inches in length, cylindric and very close: the female flowers on a different tree, collected into a globe: their receptacles axillary, glaucous-green, solitary, with short petioles: among the female flowers are some chaffy bodies, which perhaps were flowers suffocated by their neighbours and dried up: the fruit yellowish green, sweet, but eaten chiefly by birds. It is a native of Brazil.

Culture.—All the sorts are capable of being increased by seeds, layers, cuttings, grafting, and inoculating or budding.

The seed method is chiefly practised for those which are not intended as fruit-trees, as they are very liable to vary in that way. It should be sown in the early spring, as about March, on a bed of fine earth, in a warm aspect, or upon a moderate hot-bed protected with glasses, in drills to the depth of a quarter of an inch. Water should be given slightly in dry weather; and in the heat of the day shade; covering it in cold nights. When the plants appear, they should be well guarded from frost in the early spring, and be kept clean during the summer, and properly shaded and watered, protecting them the first autumn and winter, removing them in the following March into nursery rows two feet apart, and one distant, to continue a few years, when they may be set out where they are to grow. They should not be removed, either from the seed-bed or nursery rows, till perfectly strong.

When intended for feeding silk-worms, they should be kept in a low shrubby state.

They appear, from Sir George Staunton, to succeed best in China, on beds about a foot high in moist loamy soils.

When raised for fruit, great care should be taken that the layers or cuttings be not only taken from old fruit-bearing trees, but that the branches made use of be also fruit-bearing.

The layers may be made from stools formed for the purpose, or by raising large boxes, baskets, or pots of earth, so as to lay the branches in them in the autumn, by the slit method, heading them down to two eyes each. When they have taken root in the autumn following, they may be removed into the nursery and managed as the seedlings.

The cuttings should be made from the former year's shoots of such trees and branches as bear well, and have fine fruit, not being shortened, but planted their whole length, leaving two or three buds above the ground. They should be planted in March on light rich earth, pressing the mould well about them, in order that it may be kept from getting too dry.

When well rooted in the following spring, they may be removed into the nursery, being regularly trained to stems by means of stakes fixed to each of them, to which the principal shoots should be trained, removing most of the rest, except such as are necessary to detain the sap for the support of the stem.

They may be trained to Standards, Half Standards, and Dwarf Standards. See PRUNING and TRAINING.

After standing three or four years in the nursery, they will be ready to plant out for good.

They should have but little sun at the first planting of the cuttings, but afterwards as much as possible, provided the earth about them be prevented from becoming dry, by moss or other means. The cuttings also succeed well when planted in a hot-bed; and in all cases when covered by hand glasses.

Some also plant them in October.

The grafting and budding, or inoculating, are certain methods of continuing the proper kinds, and should be practised in the usual manner upon the seedling stocks of any of the species. See GRAFTING and BUDDING.

Mr. Forsyth remarks, that "as the fruit is produced on the young wood, only such branches as cross others, and such as are decayed, or broken by accident, should be cut out, applying at the same time the composition. When, however, the heads become too full of wood, it will, he thinks, be necessary to thin them, as the fruit is larger and better flavoured where the heads are kept thin of wood."

He advises planting these trees, when for fruit, in grass orchards and pleasure-grounds, as "the finest of the fruit, when ripe, frequently drops, which, if it fall on dug or ploughed ground, will be soiled and rendered unfit for use, as the earth will adhere so to the fruit as to render the cleaning of it impracticable; but if planted on lawns, or in grass orchards, the fruit can be picked up without receiving any injury. Another reason for planting these trees on lawns or in orchards is," he says, "that when full grown, they are too large for a kitchen-garden. The soil in which they thrive best is a rich, light, and deep earth."

"He has tried the efficacy of his composition on several of these trees in a very decayed hollow state of the trunk, cutting out all the dead wood and cankered parts of some, and heading down others that were stunted and sickly. After these operations they put forth vigorous branches, and bore excellent crops of fruit, more than double the size of that which they produced in their former state."

And he advises "those who have any old

decayed Mulberry-trees, to treat them in the same manner; but those which are very much decayed should be headed down; this will throw them into a healthy bearing state, and in two or three years they will, he asserts, produce plenty of fine fruit."

And as old trees of this sort bear better and have finer fruit than young ones, it is of importance, he thinks, to restore them.

The fifth and sixth sorts are tender, requiring the protection of the bark stove.

The first sort is raised for the fruit; but the others chiefly for the purpose of variety and ornament. The third is used for having the bark made into paper in some countries.

MOSSING OF FRUIT-TREES. This is a disease arising from the Moss Plant establishing itself upon such fruit-trees as are in an unhealthy state of growth or which are planted so close together as to prevent a due circulation of air and dryness. The trees, by this means, are not only injured, from the plant fixing itself upon them, and restricting their growth, but probably by the quantity of moisture that it attracts, and the dampness that is produced in that way.

For the prevention and removal of this state of fruit-trees, Mr. Forsyth advises the washing them with a mixture of fresh cow-dung, urine and soap-suds, as by this means the moss is not only prevented from growing on the trunks and branches, but the ova of insects are destroyed, the trees nourished, and the bark kept in a fine healthy state. It may also be removed by scraping the trees.

Apple-, Pear-, and Plum-trees are very liable to be affected in this way.

MOTION OF PLANTS, the course or direction of growth in different parts of them.

In the roots and stems the direction is totally opposite, the former either running directly downward into the ground, or horizontally under the surface; while the latter direct their motion towards the air and light of the sun, mostly in an upright manner, but sometimes horizontally along the surface of the ground. The causes which operate in promoting these are the quest of nourishment in the root, and the influence of the air and light of the sun on the stem; for when any number of plants growing in pots is placed in a room, which only admits a small portion of light at one place, the stems all incline towards that side; in close dark thickets, the young trees always lean to the part where the most light penetrates; and the new shoots of espalier or wall-trees detach themselves from those supports, in quest of free air and light.

It seems that the force of motion is greater in the roots than in the stems; the roots, without ever once going out of their way, pierce the hardest soils, penetrate into walls, which they overturn, and even into rocks, which they split; whereas the stems and branches surmount obstacles by leaving their natural direction, and over-topping them.

Though the natural tendency of most stems or trunks is to ascend, some by their weakness, or natural growth, descend: and occasionally by means of roots breaking out all along the stems and branches, as in the Strawberry, Penny-royal, and many other creeping plants, the stems are, by the roots striking into the earth, tethered as it were to the ground, and only their extremities have the power of directing their course upwards.

The leaves and flowers of plants also direct their course towards the air, and light of the sun; the leaves always turning their upper surface outward to the air and light; which is very obvious in Wall-trees, and when a branch is overturned, so that the leaves are inverted, they naturally direct their surfaces again gradually upwards to the light and air, though this often takes them several days' growth. Some flowers are also supposed to have a particular daily motion, so as to present their surfaces directly to the sun, and follow the diurnal course of it, as the Sun-flower, and most of the compound flowers; in all of which the disk or surface is believed to look towards the east in the morning, the south at noon, and the west in the evening.

And during the heat of the sun, the pinnated or winged leaves, particularly of the papilionaceous tribe of plants, rise vertically upward; the opposite lobes or folioles, which compose these leaves, rise so as to be generally applied close together by their upper surfaces; but in that state of the atmosphere which generally precedes a storm, or during a close, moist, cloudy air, the lobes of the same sort of leaves extend themselves commonly along the foot-stalk; and after sun-set incline still lower, and hang directly down under the foot-stalk, being applied close together like the leaves of a book, by their lower surfaces; a state which by Linnæus is called the sleep of plants.

The simple leaves of many plants, when their surface is exposed to an ardent sun, also become concave above, but gradually recover as the heat declines. But, of all the motions of the leaves of plants, none is so sudden and rapid as those of the Sensitive and Humble kinds.

There is another kind of motion in plants; that is, elasticity; which is resident particularly in some sorts of seed-vessels, such as the Yellow Balsamine, and Spurting Cucumber, &c. in which their fruits, when arrived at maturity,

burst open like a spring, and dart out their seeds with an elastic force to a considerable distance in many cases.

MOULD, such earthy substances as constitute soils, when reduced into a fine pulverized state in their particles. It is of different qualities according to the nature of the earth or soil in which it is found. But the best is probably that which contains a large proportion of carbonaceous or vegetable matter. It is of very different colours in different cases, as hazel, dark-gray, russet, ash, yellowish red, and various others. But the first three colours are generally considered as denoting the best qualities, and the last the most unfriendly for the growth of vegetables.

For the purpose of the gardener, those moulds which are capable of working well at all seasons, are rather light and dry, perfectly mellow and fine in their particles, being well enriched with vegetable and animal matters, are the most proper and capable of affording the largest crops of good vegetables. See EARTH and SOIL.

MULCH, a term made use of in gardening to signify such strawy dung as is somewhat moist and not rotted. It is found useful for protecting the roots of new-planted choice trees or shrubs from severe frost in winter, and from being dried by the fierce sun or drying winds in spring and summer, before they are well rooted; in which cases it is spread evenly on the surface of the ground round the stems of the trees, as far as the roots extend, about three or four inches thick, but which should be augmented in winter, when the severity of the frost renders it necessary. It may also be employed for many other purposes.

MOUNTAIN ASH. See SORBUS.

MOUSE-EAR. See HIERACIUM.

MUGWORT. See ARTEMISIA.

MULBERRY-TREE. See MORUS.

MUSA, a genus containing plants of the perennial kind for the hot-house.

It belongs to the class and order *Polygamia Monoecia*, and ranks in the natural order of *Scitamineæ*.

The characters are: that the hermaphrodite flowers are more towards the base of the simple spadix, separate in alternate spathes: the calyx is a partial, ovate-oblong spathe, plano-concave, large, many-flowered: the corolla unequal, ringent: the petal constituting the upper lip, but the nectary the under lip: petal erect, ligulate, truncate, five-toothed, converging in front at the base: nectary one-leafed, cordate, boat-shaped, compressed, acuminate, spreading outwards, shorter than the petal, inserted within the sinus of the petal: the stamina have six awl-shaped filaments, five of which within the petal are erect, the sixth within the nectary is reclining: anthers linear, from the middle to the top fastened to the filament; but most frequently there is only one anther on the sixth filament, and very small ones or none on the rest: the pistillum is a very large germ, obtusely three-sided, very long, inferior: style cylindric, erect, the length of the petal: stigma headed, roundish, obscurely six-cleft: the pericarpium is a fleshy berry, covered with a husk, obscurely three-sided, or six-sided, gibbous on one side, one-celled, hollow in the middle: the seeds very many, nestling, subglobular, wrinkled-tubercled, excavated at the base, or only rudiments: males on the same spadix, above the hermaphrodite flowers, separated by spathes: the calyx, corolla, and nectary as in the hermaphrodite: the stamina have filaments as in the hermaphrodites, equal, erect: anthers as in hermaphrodites, on the filament placed within the nectary, most frequently very small or none: the pistillum is a germ as in the hermaphrodites, but less: style and stigma as in them, but less and more obscure: the pericarpium is abortive.

The species cultivated are: 1. *M. paradisiaca*, Plantain Tree: 2. *M. sapientum*, Banana Tree.

The first rises with a soft herbaceous stalk, fifteen or twenty feet high, and upwards, in its native situation: the lower part of the stalk is often as large as a man's thigh, diminishing gradually to the top, where the leaves come out on every side, which are often more than six feet long and near two feet broad, with a strong fleshy midrib, and a great number of transverse veins running from the midrib to the borders: the leaves are thin and tender, so that where they are exposed to the open air they are generally torn by the wind; for, as they are large, the wind has great power over them: these leaves come out from the side of the principal stalk, inclosing it with their base; they are rolled up at their first appearance, but when they are advanced above the stalk they expand quite flat, and turn backward: as these leaves come up rolled in the manner before mentioned, their advance upward is so quick, that their growth may be almost discerned by the naked eye; and if a line is drawn across, level with the top of the leaf, in an hour's time the leaf will be near an inch above it: when the plant is grown to its full height, the spike of flowers will appear from the centre of the leaves, which is often near four feet in length, and nods on one side: the flowers come out in bunches, those on the lower part of the spike being the largest; the others diminish in their size upward; each of these bunches is covered with a spathe or sheath, of a fine purple colour

within, which drops off when the flowers open: the upper part of the spike is made up of male or barren flowers, which are not succeeded by fruit: the fruit is eight or nine inches long, and above an inch diameter, a little incurved, and has three angles; it is at first green, but, when ripe, of a pale yellow colour, having a tough skin, within which is a soft pulp of a luscious sweet flavour: the spikes of fruit are so large as to weigh upwards of forty pounds in some cases. It is a native of the East Indies, flowering from October to November.

The second species, or Banana Tree, differs from the preceding in having its stalks marked with dark purple stripes and spots: the fruit is shorter and rounder, with a softer pulp of a more luscious taste: but Mr. Dampier says, it is less luscious, though of a more delicate taste. And according to Long, it has a softer, mellower taste, and is more proper for fritters than the Plantain. A very excellent drink is made from the juice of the ripe fruit fermented, resembling the best Southam cyder. It is found in the West Indies.

There are several varieties of each species.

It is observed by Brown, that "these two fruits are among the greatest blessings bestowed by Providence upon the inhabitants of hot climates." And that "three dozen Plantains are sufficient to serve one man for a week instead of bread, and will support him much better."

Culture.—These plants may be increased by planting the young suckers of the roots of such plants as have fruited, taken off carefully with root-fibres, in large pots filled with light rich earth, and plunged in the tan-bed of the stove, in the summer season.

They afterwards require to have water given pretty plentifully in the hot summer months, but more sparingly in the winter, and in less proportions at a time. They succeed best in about the same degrees of heat as the Pine Apple. They should have the pots increased in size as they advance in growth.

But the best way to have them fruit well in this climate is to shake them out of the pots, after they have become fully established, with the balls of earth about their roots, and plant them in the tan-bed in the stove, old tan being laid round them for their root-fibres to strike into.

When new tan is added, care should be taken not to disturb their roots, and always to leave plenty of old tan about them, to guard against too much heat. They should have water twice a week in winter, about two quarts each plant at a time, and in summer twice as much at a time and every other day. The signs of perfecting their fruit, are their pushing out their flower-stems in the spring. The stoves should be sufficiently high for this purpose, as twenty feet or more.

In their native country, these trees thrive best where the soil is rich, cool, and moist. Their fruiting in the South Sea islands is said to be promoted by the use of lime and wood-ashes.

They are mostly cultivated here by way of curiosity and for variety.

MUSHROOM. See AGARICUS.

MUSTARD. See SINAPIS.

MYRICA, a genus furnishing plants of the deciduous and evergreen shrubby kinds.

It belongs to the class and order *Dioecia Tetrandria*, and ranks in the natural order of *Amentaceæ*.

The characters are: that in the male the calyx is an ovate-oblong ament, imbricate on all sides, loose, composed of one-flowered, crescent-shaped, bluntly acuminate, concave scales: perianthium proper none: there is no corolla: the stamina have four filaments (seldom six) filiform, short, erect: anthers large, twin, with bifid lobes: female—the calyx as in the male: there is no corolla: the pistillum is a subovate germ: styles two, filiform, longer than the calyx: stigmas simple: the pericarpium is a one-celled berry: the seed single.

The species cultivated are: 1. *M. Gale*, Sweet Gale, Sweet Willow, or Candle-Berry Myrtle; 2. *M. cerifera*, American Candle-Berry Myrtle; 3. *M. quercifolia*, Oak-leaved Candle-Berry Myrtle; 4. *M. cordifolia*, Heart-leaved Candle-Berry Myrtle.

The first rises with many shrubby stalks, from two to near four feet high, dividing into several slender branches, and is covered with a dusky or rust-coloured bark, sprinkled with white dots: the buds are composed of nine leafy shining scales, the first nearly opposite, very short, rectangularly pointed, the rest ovate, and blunt: the leaves are alternate, stiff, an inch and half long, and half an inch broad in the middle, light or yellowish green, smooth, a little serrate towards their points, and emitting a fragrant odour when bruised; which is occasioned by the resinous points with which they are sprinkled: they are convoluted and petioled: the flowers appear before the leaves; and the flower-buds are above the leaf-buds, at the ends of the branches, whence as soon as the fructification is completed the end of the branch dies, the leaf-buds which are on the sides shoot out, and the stems become compound: the aments or catkins are of a short ovate figure, of a yellowish brown colour, and frequently sprinkled with shining resinous golden

particles: the fruit is a coriaceous berry: the male and female aments are sometimes on distinct plants, and sometimes on the same individual. It is a native of the northern parts of Europe.

It is said, that "the northern nations formerly used this plant instead of Hops," and that "it is still in use for that purpose in some of the Western Isles, and a few places of the Highlands of Scotland."

It is here known by the names of *Sweet Gale*, *Goule*, *Gaule*, *Sweet Willow*, *Wild Myrtle*, and *Dutch Myrtle*.

The second species is a shrub, or a tree acquiring a height of thirty feet in its native state: the bark is warted: the branches unequal and straight: the leaves evergreen, somewhat clustered, blunt at the end, membranaceous-rigid, wrinkled, smooth, covered underneath with very minute, shining, orange-coloured, glandular pores: the flowers are in aments, on different individuals: the male aments, according to Miller, are about an inch long, and stand erect: and Martyn says, the female aments are sessile, axillary, linear, shorter than the leaves: scales very minute, and between each of them an oblong minute germ, longer than the scales: two filiform styles, the length of the germ; and reflex stigmas: the berry minute, roundish, yellow. It is a native of America.

The third has the stalks slender, shrubby, about four feet high, dividing into smaller branches: the leaves are about an inch and half long, and almost an inch broad, some of them having two, others three deep opposite indentures on their sides; they sit close to the branches, and end in obtuse indented points: between the leaves come out some oval catkins, which drop off: it retains its leaves all the year, and is a native of the Cape, flowering in June and July.

The fourth species has a weak shrubby stalk, five or six feet high, sending out many long slender branches, closely garnished their whole length with small heart-shaped leaves, sitting close to the branches, slightly indented and waved on their edges: the flowers come out between the leaves in roundish bunches: they have an uncertain number of stamens, and are all included in one common scaly involucre or cover. The leaves continue all the year green. It is also a native of the Cape.

Culture.—The first two sorts may be raised from seed, and the two last by layers. The first kind requires a boggy moist situation, or to be cultivated on bog earth in such circumstances.

The seeds should be procured from their native situation, and sown in pots of rich earth, in the spring, to the depth of half an inch, watering and shading them during the following summer, and on the approach of winter placed in a warm sheltered situation, or under a common frame. When the plants have attained some growth, they should be planted out in the spring in nursery rows, to remain till of proper size to be planted out in the pleasure-ground, where they succeed best in a soil that is not too dry.

The two last sorts are mostly raised by laying down the young shoots in the latter end of summer or in the autumn, twining them at a joint, and watering them well during the following summer, when the season is dry; and when they have formed good roots, which is seldom the case till the second year, they should be taken off and planted in small pots filled with soft loamy earth, being placed under glasses in a common frame, and shaded from the mid-day sun till fully rooted; when they may be removed into a warm sheltered place during the summer, and in the autumn removed into the green-house, being afterwards managed as other plants of that kind.

The first sorts are likewise sometimes raised by planting the suckers of the roots in nursery-rows as above in the autumn; and all the sorts occasionally by cuttings, though they strike root with great difficulty. In this last way the young shoots are the most proper, which should be planted in pots, and plunged in a hot-bed, covering them close with glasses.

They are introduced, the two first in sheltered clumps and borders, and the latter sorts in collections of the green-house kind, where they afford a fine fragrance in their leaves.

MYRSINE, a genus comprising a plant of the evergreen exotic shrubby kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a five-parted perianthium, small: leaflets subovate, permanent: the corolla one-petalled, half-five-cleft: segments half-ovate, converging, blunt: the stamina have five filaments, scarcely visible, inserted into the middle of the corolla: anthers awl-shaped, erect, shorter than the corolla: the pistillum is a subglobular germ, almost filling the corolla: style cylindric, longer than the corolla, permanent: stigma large, woolly, hanging on the outside of the flower: the pericarpium is a roundish berry, depressed, one-celled: the seed one, subglobular, fixed obliquely to the bottom of the berry.

The species cultivated is *M. Africana*, African Myrsine.

It has the flowers axillary, in threes, on short

peduncles: the corolla is pale, rugged with testaceous dots; ciliate, closed: the stamens opposite to, not alternate with, the segments of the corolla: the stigma is pencil-shaped: the berry of the same form and shape with that of *Uva Ursi*, and blue: the nucleus of the same shape, globular, depressed a little. It is a native of the Cape, flowering from March to May.

Culture.—This plant may be increased by sowing the seeds in spring on a hot-bed; and when the plants are fit to transplant, planting them out singly into small pots of good mould, due shade and water being given, and in the autumn they may be removed into the green-house for protection in winter.

They may also be raised by planting cuttings of the young shoots in pots in summer, due shade and water being given. They afterwards require the management of other green-house plants.

They afford variety among collections of this sort of plants.

MYRTLE. See MYRTUS.

MYRTLE, CANDLEBERRY. See MYRICA.

MYRTLE-LEAVED SUMACH. See COTARIA.

MYRTO-CISTUS. See HYPERICUM.

MYRTUS, a genus furnishing plants of the evergreen shrubby kind for the green-house and stove.

It belongs to the class and order *Icosandria Monogynia*, and ranks in the natural order of *Hesperideæ*.

The characters are: that the calyx is a one-leafed perianthium, four- or five-cleft, bluntish, superior, raised internally into a subvillose ring, permanent: the corolla has four or five petals, ovate, entire, large, inserted into the calyx: the stamina have very many capillary filaments, the length of the corolla, inserted into the calycine ring: anthers roundish, small: the pistillum is an inferior germ, two-celled or three-celled; the seeds fixed to the partition: style simple, filiform: stigma blunt: the pericarpium is an oval berry, umbilicated with the calyx, one-, two-, or three-celled: the seeds few, kidney-form.

The species cultivated are: 1. *M. communis*, Common Myrtle; 2. *M. tomentosa*, Woolly-leaved Myrtle; 3. *M. biflora*, Two-flowered Myrtle; 4. *M. lucida*, Shining Myrtle; 5. *M. dioica*, Dioecious American Myrtle; 6. *M. Zeylanica*, Ceylon Myrtle; 7. *M. acris*, Cut-leaved Myrtle; 8. *M. coriacea*, Sumach-leaved Myrtle; 9. *M. Pimenta*, Pimento, Jamaica Pepper, or Allspice.

The first is well known as an elegant evergreen shrub, but just too tender to abide the winter without some protection in this climate, except in the most southern and western parts: the trunk is irregular, branching, covered with a brown rough scaling bark: the leaves ovate or ovate-lanceolate, entire, smooth on both sides, dark-green, paler underneath, opposite and decussated: the flowers come out singly from the axils, and have a two-leaved involucre under them. It is a native of Asia and the southern parts of Europe, flowering in July and August.

There are several varieties, the principal of which are:

The Common Broad-leaved or Roman Myrtle, which grows to the height of eight or ten feet in this climate, but much higher in Italy, where it is the principal underwood of some of the forests: the leaves are broader than most of the other varieties, being an inch in breadth; they are an inch and half long, of a lucid green, ending in acute points, and are subsessile or on very short foot-stalks: the flowers are larger than those of the other varieties, on pretty long slender peduncles, from two to four at the same axil: the berries ovate, and of a dark purple colour. It is termed by some the *Flowering Myrtle*, because it flowers more freely here than the others, and *Roman Myrtle*, because it abounds about Rome.

The Box-leaved Myrtle, which has the leaves oval, small, sessile, of a lucid green, and ending in obtuse points; the branches weak, and frequently hanging down when permitted to grow without shortening; the bark is grayish: the flowers are small, and come late in the summer: the berries small and round.

The Common Italian Myrtle, which has ovate-lanceolate leaves ending in acute points; the branches grow more erect than in either of the preceding, as also the leaves, whence it is called by the gardeners *Upright Myrtle*. The flowers are not large, and the petals are marked with purple at their points, whilst they remain closed: the berries are small, oval, and of a purple colour.

There is a subvariety of this with white berries: and the *Nutmeg Myrtle* seems, according to Miller, to be only a subvariety of it.

The Orange-leaved, or what is sometimes termed Bay-leaved Myrtle, which has a stronger stalk and branches, and rises to a greater height: the leaves are ovate-lanceolate, in clusters round the branches, and of a dark green: the flowers are of a middling size, and come out sparingly from between the leaves: the berries are oval, and smaller than those of the first variety, but it is not so hardy as that.

The Portugal Myrtle, which has the leaves much smaller than those of the next, being less than an inch long, and not more than half an inch broad, lanceolate-ovate acute, of a dull green, set pretty close on the branches: the

flowers are smaller, and the berries small and oval.

The Broad-leaved Dutch Myrtle, which has leaves much less than those of the common sort, and more pointed, standing close together on the branches: the midrib on the under side of the leaves is of a purple colour: they are of a darker green, and sit closer to the branches: the flowers are smaller, on shorter peduncles, and come out a little later than those of the common sort.

The Double-flowering Myrtle, which is probably a sub-variety of this; the leaves and growth of the plant, the size of the flowers, and the time of the flowering, agreeing better with this than any of the others.

The Rosemary-leaved or Thyme-leaved Myrtle, which has the branches growing pretty erect; the leaves small, narrow, acute, sessile, and of a lucid green: the flowers are small, appearing late in the season. These varieties are constant; but there are others which are propagated in gardens and nurseries for sale, which are less considerable and more variable, as; the Gold-striped Broad-leaved Myrtle; the Broad leaved Jew's Myrtle, having frequently the leaves in threes; the Gold-striped Orange-leaved Myrtle; the Silver-striped Italian Myrtle; the Striped Box-leaved Myrtle; the Silver-striped Rosemary-leaved Myrtle; the Silver-striped Nutmeg Myrtle; and the Cock's-comb or Bird's-nest Myrtle.

The second species has the branches round, tomentose: the leaves are an inch and half long, elliptic, blunt, above dark and veined, reflex at the edge, the nerves more conspicuous underneath, smooth above, hoary underneath, on very short petioles: the peduncles axillary and terminating, solitary, opposite, tomentose: bractes two, small, oblong, at the base of the calyx, which is turbinate and tomentose, with four rounded segments: the petals oblong, tomentose-hairy without, purple within. It is a native of China, flowering in June and July.

The third rises with a divided trunk to the height of eight or ten feet, sending out many opposite branches covered with a gray bark: the leaves are shorter and rounder at the points, smoother and of a firmer texture than in the ninth sort: the flowers come out from the side of the branches between the leaves, on slender foot-stalks, about an inch in length, two generally from the same point: the berries are round, and brighter than in the ninth: but the leaves and fruit not being aromatic are not in use.

As it retains its leaves, which are of a splendent green, all the year, it makes a good appearance; but the flowers, being small and growing thinly upon the branches, do not make any great figure. It is a native of Jamaica.

The fourth species has the leaves of a singular structure, being from ovate remarkably attenuated into a lanceolate top: the flowers are five-petalled. It is a native of Surinam.

The fifth has thick leaves: peduncles axillary and terminating, brachiate-panicled, length of the leaves: petals few. Native of America.

The sixth species has a strong upright stalk, covered with a smooth gray bark, dividing towards the top into many slender stiff branches: the leaves are near two inches long, and an inch and quarter broad, of a lucid green, and on very short foot-stalks: the flowers come out at the ends of the branches, several on one common peduncle, which branches out; and each flower stands on a very slender pedicel: they are very like the flowers of the Italian Myrtle. It is a native of Ceylon.

The seventh sort may contend the palm of elegance with most trees. It grows slowly, and flowers late, twice in a year. By age it acquires thickness and height beyond the mediocrity: the trunk is handsome, straight, forming a very lofty thick beautiful pyramidal head: the bark in the younger trees is brown, then ash-coloured, finally white entirely, or with large yellow spots; it is very smooth and even, especially in old trees, but here and there hangs down in slender shreds; the flavour is astringent, not without something of aromatic: the timber very hard, red, compact, ponderous, and capable of being polished; used for the cogs of wheels in the sugar-mills, and other works where considerable friction is required: the younger branches are acutely four-cornered and green: the leaves numerous, quite entire, shining, bright green, with transverse veins, blunt, attenuated into a short petiole; they are always opposite, commonly three or four inches long, of a very sweet aromatic smell, and on account of their agreeable astringency are used for sauce with food: the flowers small, white with a slight tinge of redness: the berries round, the size of peas, crowned with the remains of the calyx, having an aromatic smell and taste, which render them agreeable for culinary purposes. It is a native of the West Indies, where it is sometimes called *Bois d'Inde*.

The eighth species has the whole of the plant smooth: the leaves petioled, an inch long, emarginate, from a reflex margin becoming convex, the upper surface shining very much, veinless, transversely but obliquely marked with dusky nerved lines; the under surface less shining: the younger leaves veined on both sides, with minute raised dots scattered over the under surface, which vanish in the older leaves, and they have dusky spots impressed on the upper

surface: the peduncles are purplish, twice as long as the leaves, subracemose, in pairs: the pedicels opposite, commonly four, very remote, three-flowered: the flowers are pedicelled: the calyx is purplish, with roundish segments: the petals oblong, small: the fruit globular, the size of a pepper-corn. It is a native of the West Indies.

The ninth grows to the height of thirty feet or more, in its native state, with a straight trunk, covered with a smooth brown bark, dividing upwards into many branches which come out opposite, garnished with oblong leaves, resembling those of the Bay-tree in form, colour, and texture, but longer, and placed by pairs: when these are bruised or broken, they have a very fine aromatic odour like that of the fruit: the branches grow very regular, so that the trees make a fine appearance, and as they retain their leaves through the year, they are worthy of being propagated for ornament and shade about the habitations of the planters: the flowers are produced in large loose bunches from the side of the branches, towards their ends; each branch is also terminated by a larger bunch than the other; the flowers are small, and of an herbaceous colour. It is a native of the West Indies, flowering in June, July, and August.

The berries are chiefly imported from Jamaica, whence the name Jamaica Pepper; and it is also named All-spice, from a notion of its taste being compounded of several other spices.

It begins to bear fruit in three years after it is planted, but does not arrive at maturity until seven, then often yielding one thousand pounds weight of fruit from an acre.

According to the editor of Miller's Dictionary, "the berries are generally gathered in July in their green state, by twisting off the twigs with the hand, or a pole cleft at one end; and are laid on cloth spread over the barbacues or terraced floors raised a little above the ground, inclosed with an upright ledge of eight or ten inches in height, and divided by transverse partitions into four or more square compartments, that each may contain a day's picking. During the first and second day they are turned often, that the whole may be more exposed to the sun; but when they begin to dry, they are frequently winnowed, and laid in cloths to preserve them better from rain and dews, still exposing them to the sun every day, and removing them under cover every evening, till they are sufficiently dried; which usually happens in ten or twelve days, and is known by the darkness of their complexion, and the rattling of the seeds: they appear at this time wrinkled, and changed to a very dark brown. In this state, being ready for the market, they are stowed in bags or casks. Some planters also kiln-dry them with great success."

Culture.—The first sort and all the different varieties are capable of being increased by planting cuttings of the strong young shoots of the same year, making them about six inches long, clearing about three inches of the bottom parts, then twisting them and setting them into pots filled with light rich earth, closing it well about them, and watering them to settle it. The pots should then be plunged in the tan hot-bed under glasses, carefully shading them from the sun. This should be done in the beginning of July, or in the early spring. It is likewise useful to cover them close with small glasses.

They may also sometimes be stricken in pots in the natural earth, under a shallow frame and glasses in the summer months, as well as in the open ground in a warm situation.

Slips set out or treated in the same manner as the cuttings, often strike root and produce good plants.

After the plants raised in any of the modes are well rooted and begin to shoot, they should be gradually inured to the open air, so as to be set out in it towards the latter end of August in a warm sheltered situation, being brought under the protection of the green-house in the beginning of autumn, and placed in the less warm parts of it, having free air admitted when the weather will permit. They should be gently watered during the winter, removing any decayed leaves that may appear upon them, and the mould of the pots kept quite clean. The plants also succeed perfectly when placed under a common frame in the winter season, air being freely admitted in fine weather.

In the succeeding spring the plants should be removed carefully with balls of earth about their roots into separate small pots of rich light earth, watering them well at the time, and setting them under a frame, or in the green-house, till perfectly established, when they may be removed into the open air, being placed in a warm aspect.

Towards the beginning of autumn they should be examined, and such plants as have their roots proceeding through the holes in the bottoms of the pots must be removed into others a size larger, loosening the mould and matted roots, afterwards filling the pots up with fresh rich earth, and watering them well. They should then be placed in a sheltered situation, trimming them to a regular figure, and turning them upright, when they have a tendency to be crooked, by proper sticks. When thus carefully trained while in their young growth,

the stems will afterwards continue straight without support.

They are also capable of being increased by layers. All such plants as are furnished with young bottom shoots low enough for laying may have them layed in spring, in the usual way, when they readily emit roots, and become fit to transplant into separate pots in the autumnal season.

And where seed is made use of it should be sown in spring, in pots of light mould, and plunged in a moderate hot-bed: the plants soon come up, which, when two or three inches high, should be potted off separately into small pots, and be managed afterwards as the others.

As the plants advance in growth, some new varieties may perhaps be produced.

Those who raise large quantities of these plants annually, should always keep some strong bushy plants, in order to furnish slips or cuttings for the purpose.

The Double-flowering and Orange-leaved Myrtles are the most difficult to raise by cuttings; and the last sort, and those with variegated leaves, are more tender than the others.

The common Broad-leaved, and Broad-leaved Dutch, as well as the Portugal sorts, succeed in the open ground in warm situations and dry soils.

Where they are intended to have bushy heads, the lower shoots should be trimmed off, and the plants only suffered to branch out at the top in different directions, so as to form handsome heads. Those which are designed to be shrubby, should have their lateral branches encouraged so that they may be well feathered from the top to the bottom. They should afterwards in general be left to take their own natural growth, except just taking off the rambling shoots. When their heads become thin and straggling, those shoots which are proper for sending out new shoots to fill up the vacancies and produce regularly should be shortened by the knife.

The practice of clipping the shrubs with garden-shears into globes, pyramids, &c., as is sometimes done, is very injurious; the necessary trimming should always be performed with the knife, and that only as above, as the plants appear to the most advantage when they grow naturally.

When the heads of the plants become very irregular, or thin and stubby, they may be renewed by heading down all the branches pretty short in spring, and shifting them into larger pots of fresh mould, with the balls of earth about their roots, giving plenty of water during summer, when they will branch out again finely, and form handsome full heads.

In respect to the general culture, as the plants advance in stature they should annually be removed into larger pots, according to the size of their roots; but care should be taken not to put them into pots too large, which causes them to shoot weak, and sometimes proves the destruction of them. When they are taken out of the former pots, the earth about their roots should be pared off, and that withinside the ball gently loosened, that the roots may not be too closely confined; and then often replace them in the same pots, when not too small, filling up the sides and bottom with fresh rich earth, and giving them plenty of water to settle the earth to their roots; which should be frequently repeated, as they require to be often watered both in winter and summer, and in hot weather they should have it in large quantities.

The proper season for shifting these plants is in April and August; for, if it be done much sooner in the spring, the plants are in a slow growing state, and not capable to strike out fresh roots again quickly; and when done later in autumn, the cold weather coming on prevents their taking root.

In the autumn, when the nights begin to be frosty, the plants should be removed into the green-house; but when the weather proves favourable they may remain abroad until the beginning of November; for, if they are carried into the green-house too soon, and the autumn should prove warm, they make fresh shoots at that season, which are weak, and often grow mouldy in winter. When the weather is so severe as to require the windows to be kept closely shut, they are often also greatly defaced; on which account they should always be kept as long abroad as the weather will permit, and be removed out again in the spring before they shoot out; and while they are in the green-house should have as much free air as possible when the weather is mild and proper for the purpose.

The tender kinds are mostly increased by seeds; but when any of them are pretty branchy, they may also be tried by layers and cuttings. And the eighth sort succeeds best in this way.

The seed should be procured from abroad, preserved in sand, &c., and be sown in spring in pots of fresh mould, plunging them in the bark-bed: the plants come up the same season; which, when two or three inches in height, should be planted out in separate small pots, and plunged in the bark-bed, supplying them with water, and managing them as other woody plants of the same kind.

As the second sort often branches out low, some of the young shoots may be layed in spring, by slit-laying or wiring, plunging the pots in

which they are layed in the tan-bed; when they will probably be well rooted in one year, though it is sometimes two before they strike good root, when they should be potted off into separate pots and managed as the others.

The last sort is best raised in this way.

The cuttings of some of the short young shoots should be made from such of the plants as afford them, planting them in pots of fresh compost in July, plunging them in the bark-bed, and covering them close with a low hand glass, giving due water.

They mostly take good root the same year, and are fit to plant out in separate small pots in the following spring.

The general management of these sorts is only that of keeping them always in the stove, except a month in the heat of summer, when they may be set out in the open air. They should be suffered to shoot nearly in their own way, keeping them, however, to upright stems, and allowing their heads to branch out according to nature, except just reducing the very irregular branches, giving frequent waterings in common with other woody plants of the same kind, and shifting them occasionally into larger pots.

The first sort and varieties are highly ornamental plants for the borders and green-house, and the other tender sorts in the stove collections.

NAPÆA, a genus containing plants of the hardy herbaceous flowery perennial kind.

It belongs to the class and order *Dioecia Monadelphia (Monadelphia Polyandria)*, and ranks in the natural order of *Columniferæ*.

The characters are: that in the male the calyx is a bell-shaped five-cleft perianthium, round, permanent: the corolla has five oblong petals, concave, patulous, convex with oblong claws: the stamina have very many capillary filaments, of a middling length, connected in a column: anthers roundish, compressed: the pistillum is a conical germ, minute: style cylindric, ten-cleft, capillary: stigmas none: the pericarpium abortient: female on a distinct individual: the calyx and corolla as in the male: the stamina have filaments as in the male, but shorter: anthers small, effete: the pistillum is a conical germ: style as in the male, longer than the stamens: stigmas blunt: the pericarpium has ten capsules, converging into an ovate form, sharpish, awnless: the seeds are solitary, and kidney-form.

The species cultivated are: 1. *N. lævis*, Smooth Napæa; 2. *N. scabra*, Rough Napæa.

The first has a perennial root, frequently creeping: the stems smooth, about four feet high: the leaves alternate, upon pretty long slender foot-stalks, deeply cut into three lobes, which end in acute points, and are regularly serrate; those on the lower part of the stem are near four inches long, snd almost as much in breadth, but they diminish gradually to the top of the stem. At the base of the leaf comes out the peduncle, about three inches long, dividing at top into three smaller, each sustaining one white flower, smaller than in the second sort, with a longer column of stamens, the anthers standing out beyond the corolla. It is a native of Virginia.

The second has also a perennial root, composed of many thick fleshy fibres, striking deep into the ground, and connected at the top into a large head, from which come out many rough hairy leaves, near a foot diameter each way, deeply cut into six or seven lobes, irregularly indented on their edges, each lobe having a strong midrib, all meeting at the foot-stalk, which is large and long, arising immediately from the root: the flower-stalks seven or eight feet high, dividing into smaller branches, having one leaf at each joint, of the same form as those below, but diminishing in size towards the top, where they seldom have more than three lobes, which are divided to the foot-stalk. Towards the upper part of the stalk comes out from the side at each joint a long peduncle, branching out towards the top, and sustaining several white flowers, which are tubulous at bottom where the segments of the petal are connected, but spread open above, and are divided into five obtuse segments: the male plants are barren; but in the female plants the flowers are succeeded by ten capsules, placed in a ring, semicircular, finishing at top in a re-

curved dagger-point, compressed wedge-shaped, convex on the back, with a raised line along the middle, flat at the sides and subcrenulate towards the dorsal margin, one-celled, valveless, or sometimes but seldom opening by two valves: the flowers are in heads, and the fruit orbicular, depressed, consisting of eight or ten joints. It is also a native of Virginia.

Culture.—These plants are easily increased by seeds, which should be sown on a bed of common earth in the spring, keeping them clear from weeds till autumn, and then transplanting them where they are to remain. They succeed best in a rich moist soil, in which they will grow very luxuriantly, and must be allowed room.

The first sort may also be increased by parting the roots, and planting them out where they are to remain in the autumn.

They afford variety among other plants in the borders.

NAPELLUS. See ACONITUM.

NAPO-BRASSICA. See BRASSICA.

NAPUS. See BRASSICA.

NARCISSO-LEUCOIUM. See LEUCOIUM.

NARCISSUS, a genus containing plants of the bulbous-rooted perennial flowering kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Spathaceæ*.

The characters are: that the calyx is an oblong spathe, obtuse, compressed, opening on the flat side, shrivelling: the corolla has six ovate, acuminate petals, flat, equal, inserted into the tube of the nectary externally above the base: nectary one-leafed, cylindric-funnel-form, coloured on the border: the stamina have six awl-shaped filaments, fixed to the tube of the nectary, shorter than the nectary: anthers oblongish: the pistillum is a roundish germ, obtusely three-sided, inferior: style filiform, longer than the stamens: stigma bifid, concave, obtuse: the pericarpium is a roundish capsule, obtusely three-cornered, three-celled, three-valved: the seeds are many, globular, and appendicled.

The species cultivated are: 1. *N. pseudo-narcissus*, Common Daffodil; 2. *N. poeticus*, Poetic, or White Narcissus; 3. *N. biflorus*, Two-flowered Narcissus, or Pale Daffodil; 4. *N. bicolor*, Two-coloured Narcissus; 5. *N. minor*, Least Daffodil: 6. *N. triandrus*, Rush-leaved Narcissus, or Reflexed Daffodil; 7. *N. orientalis*, Oriental Narcissus; 8. *N. Bulbocodium*, Hoop-Petticoat Narcissus; 9. *N. tazetta*, Polyanthus Narcissus; 10. *N. serotinus*, Late-flowering Narcissus; 11. *N. odorus*, Sweet-scented Narcissus, or Great Jonquil; 12. *N. calathinus*, Calathine Yellow Narcissus; 13. *N. jonquilla*, Common Jonquil.

The first has a large bulbous root, from which come out five or six flat leaves, about a foot long, and an inch broad, of a grayish colour, and a little hollow in the middle like the keel of a boat: the stalk rises a foot and half high, having two sharp longitudinal angles; at the top comes out one nodding flower, inclosed in a thin spathe: the corolla is of one petal, being connected at the base, but cut almost to the bottom into six spreading parts; in the middle is a bell-shaped nectary, called by gardeners the cup, which is equal in length to the petal, and stands erect: the petal is of a pale brimstone or straw colour, and the nectary is of a full yellow: the seeds are roundish, black. It is a native of many parts of Europe, flowering in March.

There are varieties with white petals and a pale yellow cup, with yellow petals and a golden cup, with a double flower; with three or four cups within each other; Tradescant's large double; long-tubed flowered; short-tubed; dwarf-stalked; and the peerless Daffodil.

Many other varieties have likewise been noticed by writers.

The second species has a smaller and rounder bulb than the first: the leaves are longer, narrower, and flatter: the stalk or scape does not rise higher than the leaves, which are of a gray colour: at the top of the stalk comes out one flower from the spathe, nodding on one side: the corolla snow white, spreading open flat, the petals rounded at the points: the nectary or cup in the centre is very short, and fringed on the border with a bright purple circle: the flowers have an agreeable odour, appear in May, and seldom produce seeds. It is a native of Italy, &c. flowering in April.

There are varieties with double white flowers, with purple-cupped flowers, and with yellow-cupped flowers.

The third usually produces two flowers: it frequently occurs, however, with one, more rarely with three; in a high state of culture it probably may be found with more. When it has only one flower, it may easily be mistaken for one of the varieties of the second sort, but may be distinguished from it by the petals being of a yellowish hue, or rather a pale cream colour; the nectary wholly yellow, not having the orange or crimson rim, and by its flowering at least three weeks earlier; the top also of the flowering stem very soon after it emerges from the ground bends down and becomes elbowed; whereas in that it continues upright till within a short time of the flower's expanding. It is a native of several parts of Europe, flowering in May.

There are two or three varieties, as with sulphur-coloured flowers, and with white reflexed petals, with gold-coloured borders.

The fourth species resembles the first; but

the petals are white, the nectary is dark yellow and larger, with a speading, waved, notched border. Gouan thinks it is easily distinguished by its leaves, which are scarcely a palm in length and half an inch in breadth; by its large flower, with cordate-ovate petals, imbricate at the base, and sulphur-coloured, and by the nectary having a reflex mouth, twelve-cleft or thereabouts, the lobes also being toothed and curled: the scape is the length of the leaves, or a little shorter, and thick. It is a native of the South of Europe, flowering in April and May.

There is a large variety, which approaches in its general appearance very near to the first sort; but it is a much taller plant, and has its leaves more twisted, as well as more glaucous: the flower, but especially the nectary, is much larger, and the petals are more spreading. It is of a fine deep yellow colour, having sub-varieties with double flowers, and is a native of Spain, flowering in April. It is sometimes known by the title of Great Yellow *Spanish-Bastard Daffodil.*

The fifth is nearly related to the first sort, but is three times smaller in all its parts: the scape is scarcely striated: the spathe is greenish: the flowers more nodding: the petals distinct at the base, lanceolate, straight, not oblique or ovate: the margin of the nectary six-cleft, waved, curled. But though the flowers are not so large as those of the other species, when the roots are planted in a cluster, they make a very pretty show, and have this advantage, that they flower somewhat earlier than any of the others. It is a native of Spain.

The sixth is of the same size with the second, but the leaves are narrower by half and channelled: the spathe one-flowered: the whole corolla snow-white: the petals ovate-oblong: the nectary bell-shaped, shorter by half than the corolla, with the margin straight, and unequally crenulate: the stamens three, seldom six: the anthers dark yellow, shorter than the nectary. In nurseries the flowers are of a pale yellow, having two and sometimes three flowers from a spathe. It is a native of Portugal.

There are varieties with cup and petals wholly of a gold colour; with yellow with a white cup; and with white, with a yellow cup.

The seventh species is broad-leaved, having the appearance of the ninth sort: the corolla is white: the nectary erect, half or one-third of the length of the petals, trifid, yellow, with the lobes emarginate. It is a native of the Levant, flowering in May.

There are several varieties.

The eighth has small bulbs: the leaves very narrow, having some resemblance to those of the Rush, but a little compressed, with a longitudinal furrow on one side; they are seldom more than eight or nine inches long: the flower-stalk slender, taper, about six inches long: petal scarce half an inch long, cut into six acute segments: the nectary or cup is more than two inches long, very broad at the brim, lessening gradually to the base, formed somewhat like the old farthingale or bell-hoop petticoat worn by the ladies. It is a native of Portugal, flowering in April or May.

The ninth species has a large, roundish bulb: the leaves three or four, long, narrow, plane: the scape or flower-stalk upright, broadish, angular, concave, from ten or twelve to eighteen inches in height: the flowers six or seven to ten from one spathe, very fragrant, clustered, white or yellow. It is a native of Spain and Portugal, &c., flowering in February and March.

There are a great many varieties: the principal of which are; with yellow petals, with orange, yellow, or sulphur-coloured cups or nectaries; with white petals, with orange, yellow, or sulphur coloured cups or nectaries; with white petals, with white cups or nectaries; and with double flowers of the different varieties.

The flower catalogues contain about a hundred sub-varieties under these heads. It may be observed, that "the varieties with white petals and white cups are not so much esteemed as the others; there are, however, two or three with large bunches of small white flowers, which are valuable for their agreeable odour, and for flowering later than most of the others. There is also one with very double flowers, the outer petals white, those in the middle some white, others orange-coloured," which "has a very agreeable scent, flowers early, and is generally called the *Cyprus Narcissus,*" and is the most beautiful of all the varieties when blown in glasses in rooms or other places.

The tenth has a small bulb: the leaves few, narrow: the stalk jointed, nine inches high: the corolla white, cut into six narrow segments: the cup yellow. It flowers late in the autumn, and is a native of Spain, Italy, and Barbary.

The eleventh species has the flower deep yellow, three times as large as that of the ninth, sometimes one only from a spathe, but frequently more: the nectary not fringed, but divided at the mouth into six blunt lobes. It possesses more fragrance than many of the others. It is a native of the South of Europe, flowering in April and May.

It varies with double flowers.

The twelfth resembles the ninth very much, but the petals are a little larger and sharper; the nectary is the same length with the petal: the leaves two or three, a foot or more in length: the stem is slender, strong, a foot in length: the

flowers two or three from a spathe, very elegant, large and loose: the petals yellow: the cup half an inch long, sinuated at the edge, of a deeper yellow colour. It flowers in April, and is a native of the southern parts of Europe and of the Levant.

The thirteenth is named from the narrowness of its leaves, like those of Rushes; there are two or three of them usually on a plant, and they are angular, fleshy, and almost round: the scape is round, hollow, producing at top from three to five flowers from a spathe, sometimes no more than two, very fragrant petals orbiculate or mucronate, both they and the cup yellow: the bulb small, white, covered with dark membranes. It is a native of Spain, flowering in April and May.

It varies with double flowers.

Culture.—All these different species and varieties may be increased with facility, by planting the off-set bulbs from the roots; and by sowing the seed in order to procure new varieties, which is chiefly practised for the fine sorts of Polyanthus Narcissus.

For this last purpose the seed should be carefully saved from the best and most curious plants after being perfectly ripened.

The seed should be sown soon after it becomes ripe, as about the beginning of August, in shallow boxes or flat pans perforated with holes in the bottoms, and filled with fresh light sandy earth, being covered about a quarter of an inch deep with fine sifted mould, and placed in such situations as are only exposed to the morning sun, till the beginning of winter, when they should be removed to have the full sun, and be sheltered from severe weather. In the spring, when the plants appear, they should be occasionally watered in dry weather, and be screened from the mid-day heat, removing them into cooler situations as the warm season advances, keeping them free from all sorts of weeds. Towards the latter end of the summer, when their stems decay, the surface mould of the boxes or pans should be stirred or wholly removed, and some fresh mould sifted over the plants, being careful not to disturb the roots, and keeping them rather dry in a shaded place.

They should have the same management annually, till the period of their leaves decaying in the third summer, when the bulbs should be taken up, and the largest separated and planted out on raised beds of light fine mould, in rows six inches apart, and three or four distant in them, having the depth of two or three inches. The smaller bulbs may be covered in on another bed with fine mould, to remain till of sufficient size to be planted out as above.

They should afterwards be kept clean; and when they show flowers so as to ascertain their properties, they may be removed, and managed in the manner directed below.

The off-set bulbs of the old plants, especially the double sorts, should be separated from the roots annually, or at furthest every two or three years, in the latter part of the summer, when their leaves and stems decay, planting their larger bulbs out at different times, from the end of August to the beginning of November, in order to afford variety; but the earlier they are planted the stronger they blow. When left out of the ground till February, or later, they mostly appear weak.

They succeed best where the soil is of a light, dry, fresh, hazel, loamy quality, and the aspect south-easterly; as where inclined to moisture they are very apt to be destroyed.

They afterwards only require to be kept free from weeds, and to have the ground stirred above them in the autumn.

The small bulbs may be planted out in rows in nursery-beds to increase for being planted out in the same manner.

When these roots are planted in the open borders or other places, in assemblage with other bulbous flowers, they should be deposited in little patches, about three or four roots in each, putting them in with a blunt dibble, or holing them in with a garden-trowel, three or four inches deep; in which mode they display their flowers more conspicuously than when planted singly.

Where a large quantity are planted out alone in beds in order to exhibit a full bloom, as often practised with the fine *Polyanthus-Narcissus*, Jonquils, &c. the beds should be four feet wide, with foot-and-half or two-feet wide alleys between them; in these beds the roots should be planted in rows length-ways, nine inches asunder, either with a blunt dibble or with a hoe, three or four inches deep, and six distant in each row, covering them evenly with the earth, and raking the surface smooth.

In order to blow the *Polyanthus-Narcissus* and Jonquil in the highest perfection, curious florists often bestow particular care in their culture: some, preparing beds of compost, as for the fine Hyacinths, &c. managing them in the same manner. But they succeed well in beds of light dry mould.

Where the bulbs of this sort are intended for sale, they should be lifted at furthest every two years, to prevent their becoming flattened by pressure, and of course less valuable.

The bulbs may be retained out of the ground

two or three months where it is necessary; but it is better to replant them as above.

Culture in Glasses. — It is sometimes the practice to cultivate the Polyanthus Narcissus and some of the large Jonquil kind in glasses in rooms, in order to blow in the winter or early spring season. For this purpose dry firm bulbs should be chosen, and one placed in each single glass or bottle provided for the purpose, any time from October till the spring, being then filled up to the roots of the bulbs with soft water, and deposited in a light warm place: in this method the plants soon begin to grow, and send forth flower-stems, affording good flowers, which have a very ornamental appearance.

The principal circumstances to be regarded in this management are, those of keeping the glasses well supplied with fresh portions of water, so as constantly to be up to the lower part of the roots, and changing the whole, so as to keep it always in a pure state.

They may likewise be raised in pots filled with light sandy mould, and placed in the same situations.

Also in hot-houses, they may be made to blow early, when kept either in pots or glasses.

When planted out in the manner mentioned above, in the borders, clumps, and other parts of pleasure-grounds, they are most of them highly ornamental, producing much variety in the early spring months.

All the different principal sorts may be procured from the seeds-men in London, who import them for sale from Holland, where they are raised in large quantities.

NASTURTIUM. See TROPÆOLUM.

NAVELWORT. See COTYLEDON and CYNOGLOSSUM.

NAVEW. See BRASSICA.

NECTARINE. See AMYGDALUS.

NELUMBO. See NYMPHÆA.

NEPETA, a genus containing plants of the herbaceous perennial kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leafed perianthium, tubular, cylindric: mouth five-toothed, acute, erect: upper toothless longer; lower more spreading: the corolla is one-petalled, ringent: tube cylindric, curved inwards: border gaping, opening, spreading, cordate, ending in two reflex blunt very short segments: upper lip erect, roundish, emarginate; lower roundish, concave, larger, entire, crenulate: the stamina have four awl-shaped filaments beneath the upper lip, approximating, two of them shorter: anthers incumbent: the pistillum is a four-cleft germ: style filiform, length and situation of the stamens: stigma bifid, acute: there is no pericarpium: calyx straight, containing the seeds in its bosom: the seeds four, and sub-ovate.

The species cultivated are: 1. *N. cataria*, Common Catmint; 2. *N. Pannonica*, Hungarian Catmint; 3. *N. nuda*, Naked or Spanish Catmint; 4. *N. Italica*, Italian Catmint; 5. *N. tuberosa*, Tuberous-rooted Catmint.

The first has a perennial root, from which arise many branching stalks, two feet high and more, upright, pubescent: the leaves are of a velvet-like softness, wrinkled, ash-coloured or hoary, particularly underneath: spikes composed of interrupted whorls terminate the stem, and come out in branches from the axils of the leaves: the flowers are subsessile, and separated at the base by a small lanceolate bracte: the calyx downy with green ribs: the corolla white, with a tinge of red, and spotted with purple: the whole plant has a strong scent between Mint and Pennyroyal. It is called Catmint, from cats being very fond of it. It is a native of most parts of Europe, flowering from July to September.

The second species has a perennial root, branched, woody, the size of a quill or more, brown on the outside, knobbed at the end: the stems several, from three to four feet in height, grooved, smoothish, with opposite branches forming a panicle: the leaves oblong, blunt, scarcely cordate, bluntly serrate, smooth, the lower ones on longer petioles, the upper ones on very short ones; they are successively smaller as they approach the racemes, till they become so small that the ends of the racemes seem to be leafless: the racemes are axillary and opposite, containing about twenty flowers: the bractes almost bristle-shaped: the calyx somewhat villose and striated: the corolla more or less red; in the cultivated plant very deep, and elegantly dotted. It is a native of Hungary, &c., flowering from August to October.

The third has the stems two feet high, smooth, strict, four-grooved; the older ones dark purple: the leaves blunt, veined, naked, rugged on both sides: the racemes brachiate: the bractes linear: the flowers distinct: the corollas whitish-rufescent, with the beard of the palate white, and the throat dotted with purple. According to Haller, the flowers are blue and white. It is a native of the South of Europe, flowering from June to August.

In the fourth species, the stalks seldom rise more than a foot and half high, sending out very few branches: the whorls of flowers

which form the spike are distant from each other, and sit close to the stalk: the leaves short, oval, heart-shaped: the plant is hoary and strong scented. It is a native of Italy, flowering from June to August.

The fifth has a thick knobbed root, from which come out one or two stalks, that often decline to the ground; they are about two feet and a half long, and send out two side branches opposite: the leaves are oblong, crenate, sessile, deep green: the upper part of the stalk, for more than a foot in length, has whorls of flowers, the lower ones two inches asunder, but nearer all the way up; they sit very close to the stalks, and are guarded by small bractes: the corolla is blue. It is a native of Spain and Portugal, flowering from June to August.

Culture.—These plants are capable of being increased by seeds, parting the roots, slips, and cuttings, but the first is the principal mode.

The seeds may be sown in the autumn or spring, on a bed of light earth, raking it in lightly: when the plants have attained some growth, they may be planted out in nursery rows, to remain till the autumn, when they may be set out where they are to remain; or they may remain where sown, only thinning them properly out.

The partings of the roots may be set out separately, where they are to remain, in the beginning of the autumn, or spring, being afterwards kept free from weeds.

Slips or cuttings of the branches may be planted out in the spring in shady situations, occasional supplies of water being given till they have stricken root.

The first sort and varieties, as well as many of the others, may afford variety in the borders, clumps, and other parts of pleasure-grounds, in mixture with herbaceous plants of different descriptions. They are likewise some of them cultivated for medicinal use.

NERIUM, a genus comprehending plants of the evergreen flowering shrubby kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Contortæ*.

The characters are: that the calyx is a five-parted perianthium, acute, very small, permanent: the corolla is one-petalled, funnel-form: tube cylindric, shorter than the border: border very large, five-parted; segments wide, blunt, oblique: nectary a crown terminating the tube, short, lacerated into capillary segments: the stamina have five, awl-shaped filaments, very short, in the tube of the corolla: anthers sagittate, converging, terminated by a long thread: the pistillum a roundish germ, bifid: style cylindric, the length of the tube: stigma truncate, sitting on an orblet, fastened to the anthers: the pericarpium has two follicles, round, long, acuminate, erect, one-valved, opening longitudinally: the seeds numerous, oblong, crowned with down, placed imbricately.

The species cultivated are: 1. *N. oleander*, Common Rosebay, or Oleander; 2. *N. odorum*, Sweet-Scented Rosebay, or Oleander: 3. *N. antidysentericum*, Oval-Leaved Rosebay; 4. *N. coronarium*, Broad-Leaved Rosebay.

The first rises with several stalks to the height of eight or ten feet: the branches come out by threes round the principal stalks, and have a smooth bark, which in that with red flowers is of a purplish colour, but in that with white flowers of a light green: the leaves for the most part stand by threes round the stalks, upon very short footstalks, and point upwards; they are three or four inches long, and three quarters of an inch broad in the middle, of a dark green, very stiff, and end in acute points: the flowers come out at the end of the branches in large loose bunches, and are of a bright purple, or crimson colour, or of a dirty white. It is a native of the Levant, flowering in July and August.

In warm dry summers this plant makes a fine appearance, the flowers then opening in great plenty; but in cold moist seasons the flowers often decay without expanding, unless the plants are placed in a green-house or under a glass-case.

The variety with white flowers is the most tender; but there are others, as the Stripe-leaved; the Broad-leaved Double-flowered, the Striped Double-flowered, and with different shades of red from purple to crimson or scarlet.

The second species rises with shrubby stalks six or seven feet high, covered with a brown bark: the leaves are stiff, from three to four inches long, and not more than a quarter of an inch broad, of a light green, and the edges reflexed; they are opposite, or alternate, or by threes round the branches: the flowers are produced in loose bunches at the ends of the branches; they are of a pale red, and have an agreeable musky scent. It grows naturally in India, flowering from June to August.

There is a variety with leaves six inches long, and one inch broad in the middle, of a much thinner texture than those of the first, and their ends are generally reflexed; they are of a light green, and irregularly placed on the branches by pairs, alternately, or by threes: the flowers are produced in very large bunches at the end of the branches, upon long peduncles; they have three or four rows of petals one within another: they are much larger than those of the common

sort, and smell like those of hawthorn: the plain flowers are of a soft red or peach colour; but in most they are beautifully variegated with a deeper red, and make a fine appearance: the usual time of flowering is in July and August, but in a warm stove it will continue in flower till Michaelmas: from the flowers being double, they are not succeeded by seeds. They are all supposed to have a poisonous quality.

The third is a middle sized tree, with brachiate branches: the leaves opposite, flat, quite entire, smooth: the flowers herbaceous or greenish white, in short subterminating racemes: the segments of the crown oblong, alternately trifid and linear. It is a native of the East Indies.

The fourth species is an elegant branched shrub, four feet high, milky, with an ash-coloured bark: the younger branches are shining, green, compressed a little, opposite at the end: the leaves long, lanceolate, acute, quite entire, shining, on short petioles, opposite: the peduncles one-flowered, thickish, in pairs from the divisions of the branchlets and decussating with them: the flowers handsome, but without scent: the perianthium green: tube of the corolla greenish yellow: the border snow-white. It is a native of the East Indies, flowering most part of the summer.

Culture.—These plants may be increased by layers, cuttings, and suckers from the roots.

The layers should be made in the early spring months, as from March till May, but the earlier the better; the youngest lower branches being chosen for the purpose, which should be slit-layed, giving plenty of water during the summer, and they will be mostly rooted by the autumn following; but by plunging the pots in which they are layed in a bark hot-bed their rooting may be greatly forwarded: when they are properly rooted, they may be taken off and removed into separate pots.

The cuttings should be planted in the spring or the early part of summer, taking off the young shoots, five or six inches long, and planting them in large pots of rich mould, placing them under glasses, and giving water and shade occasionally: but if plunged in a bark-bed it will greatly promote and forward their rooting.

The suckers arising from the bottom are sometimes furnished with roots, but when this is not the case a small slit should be given at the lowest part; afterwards applying fresh mould around it, when fibres will be emitted by the end of summer; they may then be taken off and potted separately.

The first sort and varieties is rather hardy, but should be kept constantly in pots or tubs, to be protected through severe winters.

The other sorts are often placed in the hot-house during winter, but when less tenderly treated and supplied more freely with air in mild weather, they are said by some to succeed better, provided they be carefully screened from every effect of frost or severe cold.

They are very ornamental among other potted plants of the less tender kinds.

NETTLE-TREE. See CELTIS.

NEW JERSEY TEA. See CEANOTHUS.

NICKER TREE. See GUILANDINA.

NICOTIANA, a genus containing plants of the herbaceous annual kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Luriacæ*.

The characters are: that the calyx is a one-leafed perianthium, ovate, half-five-cleft, permanent: the corolla is one-petalled, funnel-form: tube longer than the calyx: border somewhat spreading, half-five-cleft, in five folds: the stamina have five awl-shaped filaments, almost the length of the corolla, ascending: anthers oblong: the pistillum is an ovate germ: style filiform, the length of the corolla: stigma capitate, emarginate: the pericarpium is a subovate capsule, marked with a line on each side, two-celled, two-valved, opening at top: receptacles half-ovate, dotted, fastened to the partition: the seeds numerous, kidney-form, wrinkled.

The species cultivated are: 1. *N. fruticosa*, Shrubby Tobacco; 2. *N. Tabacum*, Virginian Tobacco; 3. *N. rustica*, Common or English Tobacco.

The first rises with very branching stalks about five feet high: the lower leaves a foot and half long, broad at the base where they half embrace the stalks, and about three inches broad in the middle, terminating in long acute points: the stalks divide into many smaller branches, terminated by loose bunches of flowers of a bright purple colour, succeeded by acute-pointed seed-vessels. It was found at the Cape.

There is a variety which rises about five feet high: the stalk does not branch so much as that of the former: the leaves are large and oval, about fifteen inches long and two broad in the middle, but diminish gradually in size to the top of the stalk, and with their base half embrace it: the flowers grow in closer bunches than those of the former, and are white: they are succeeded by short, oval, obtuse seed-vessels. It flowers about the same time with the former, and grows naturally in the woods of the island of Tobago.

The second species has a large, long, annual root; an upright, strong, round, hairy stalk, branching towards the top; leaves numerous, large, pointed, entire, veined, viscid, pale green;

bractes long, linear, pointed: the flowers in loose clusters or panicles: the calyx hairy, about half the length of the corolla, cut into five narrow segments: tube of the corolla hairy, gradually swelling towards the border, where it divides into five folding acute segments of a reddish colour. It is a native of Virginia.

There are several varieties; as the great broad-leaved, in which the leaves are more than a foot and a half long, and a foot broad, their furfaces very rough and glutinous, and their bases half embrace the stalk. In a rich moist soil the stalks are more than ten feet high, and the upper part divides into smaller branches, which are terminated by loose bunches of flowers standing erect: they have pretty long tubes, and are of a pale purplish colour. It flowers in July and August, and is the sort commonly brought to market in pots, being sometimes called Oronoko Tobacco.

There is another, in which the stalks seldom rise more than five or six feet high, and divide into more branches. The leaves are about ten inches long and three and a half broad, smooth, acute, sessile; the flowers are rather larger, and of a brighter purple colour. It flowers at the same time; and is called by some Sweet-scented Tobacco.

The narrow-leaved rises with an upright branching stalk, four or five feet high. The lower leaves are a foot long, and three or four inches broad: those on the stalks are much narrower, lessening to the top, and end in very acute points, sitting close to the stalks; they are very glutinous. The flowers grow in loose bunches at the top of the stalks; they have long tubes, and are of a bright purple or red colour. They appear at the same time with the former.—These varieties are also all natives of America.

The third has the stalks seldom rising more than three feet high: the leaves smooth, alternate, upon short footstalks: the flowers in small loose bunches on the top of the stalks, of an herbaceous yellow colour, appearing in July. It is commonly called English Tobacco, from its having been the first introduced here, and being much more hardy than the other sorts. It came originally from America, under the name of Petum.

There is a variety which rises with a strong stalk near four feet high; the leaves are shaped like those of the preceding, but are greatly furrowed on their surface, and near twice the size, of a darker green, and on longer footstalks. The flowers are of the same shape, but larger.

Culture.—The two first sorts may be increased by sowing the seeds annually in the spring, as March, on a hot-bed, the last in the natural ground.

The seeds should be covered about a quarter of an inch deep; and when the plants are come up they should be allowed fresh air daily, and occasional waterings, managing them as tender annuals. When the plants are from three to six inches high, as in May or the following month, they should be planted out in moist weather, in the open ground; such as are designed for ornament, singly, and those intended for use, in rows, any where, three feet asunder; giving a good watering as soon as planted, repeating it occasionally till the plants have got fresh root.

The second species may also be raised by sowing the seeds in a warm border in April, for setting out in the same manner, or by sowing in patches in the flower borders, &c. to remain, thinning the plants afterwards to one in each patch.

In the third sort the seeds may be sown in any bed or border in the spring, raking them in lightly. When the plants are three inches high, they should be planted out where they are to remain; or they may be sown in patches to remain, thinning the plants out afterwards as above.

In America, where regular plantations are made, the method is this:

"The beds being prepared and well turned up with the hoe, the seed, on account of its smallness, is mixed with ashes, and sown upon them, a little before the rainy season. The beds are raked, or trampled with the feet, to make the seed take the sooner. The plants appear in two or three weeks. As soon as they have acquired four leaves, the strongest are drawn up carefully, and planted in the field by a line, at the distance of about three feet from each plant. If no rain fall, they should be watered two or three times. Every morning and evening the plants must be looked over, in order to destroy a worm which sometimes invades the bud. When they are about four or five inches high they are to be cleaned from weeds and moulded up. As soon as they have eight or nine leaves, and are ready to put forth a stalk, the top is nipped off, in order to make the leaves longer and thicker. After this the buds which sprout at the joints of the leaves are all plucked, and not a day is suffered to pass without examining the leaves, to destroy a large caterpillar which is sometimes very destructive to them. When they are fit for cutting, which is known by the brittleness of the leaves, they are cut with a knife close to the ground; and, after lying some time, are carried to the drying

shed or house, where the plants are hung up by pairs, upon lines, leaving a space between that they may not touch one another. In this state they may remain to sweat and dry. When perfectly dry, the leaves are stripped from the stalks, and made into small bundles tied with one of the leaves. These bundles are laid in heaps, and covered with blankets. Care is taken not to overheat them, for which reason the heaps are laid open to the air from time to time and spread abroad. This operation is repeated till no more heat is perceived in the heaps, and the Tobacco is then stowed in casks for exportation." But, "In China, where the use of tobacco both in snuff and for smoking is very general, buildings are not thought necessary, according to sir George Staunton, as they are in the West Indies, for curing it; there being little apprehension of rain to injure the leaves when plucked. They are hung on cords to dry without any shelter, upon the spot in which they grew."

It is probable that this plant might be grown with advantage in this climate if it were not prohibited.

These sorts, when cultivated for the purpose of ornament, produce a fine effect by their leaves and flowers in the autumn, and alfo afford much variety.

NIGELLA, a genus containing plants of the hardy herbaceous flowering annual kind.

It belongs to the class and order *Polyandria Pentagynia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that there is no calyx: the corolla has five petals, ovate, flat, blunt, spreading, more contracted at the base: the nectaries eight, placed in a ring, very short; each two-lipped; outer lip larger, lower, bifid, flat, convex, marked with two dots; inner lip shorter, narrower, from ovate ending in a line: the stamina have numerous awl-shaped filaments, shorter than the petals. Anthers compressed, blunt, erect: the pistillum has several germs (five to ten), oblong, convex, compressed; erect, ending in styles which are awl-shaped, angular, very long, but revolute, permanent: stigmas longitudinal, adnate: the pericarpium capsules as many, oblong, compressed, acuminate, connected on the inside by the suture, gaping on the inside at top: the seeds very many, angular, and rugged.

The species cultivated are: 1. *N. damascena*, Common Fennel-flower; 2. *N. sativa*, Small Fennel-flower; 3. *N. arvensis*, Field Fennel-flower; 4. *N. Hispanica*, Spanish Fennel-flower; 5. *N. orientalis*, Yellow Fennel-flower.

The first rises with an upright branching stalk a foot and a half high: the leaves much longer and finer than those of the third: the flowers are large, pale blue, with a five-leaved involucre under each, longer than the flower; they are succeeded by larger swelling seed-vessels, with five horns at the top. It is a native of the South of Europe, flowering from June to September.

From the fine cut leaves about the flower, it has the names of *Fennel-flower*, *Devil-in-a-bush*, and *Love-in-a-mist*; but the first is become obsolete.

There is a variety with single white flowers, and another with double flowers, which is frequently cultivated in gardens with other annuals for ornament.

The second species rises to the same height as the preceding: the leaves are not so finely cut, and are a little hairy: at the top of each stalk is one flower, composed of five white petals, which are slightly cut at their end into three points; these are succeeded by oblong swelling seed-vessels with five horns at the top, filled with small pale-coloured seeds. It is a native of Candia and Egypt, flowering from June to September.

The third rises with slender stalks near a foot high, either single or branching out at the bottom, and having a few very fine-cut leaves, somewhat like those of Dill. Each branch is terminated by one star-pointed flower, of a pale blue colour, without any leafy involucre: they are succeeded by capsules, having five short horns, inclining different ways at the top, and are filled with rough black seeds. It is a native of Germany, &c. flowering from June to September.

There is a variety with white flowers, and another with double flowers.

The fourth species rises near a foot and half high; the lower leaves are finely cut; but those on the stalks are cut into broader segments: the flowers are larger than those of the other species, and of a fine blue colour, with green veins at the back: the nectaries of a sea-green colour: the pistils are of equal length with the petals; they with the stamens are of a deep purple or puce colour: the capsule has five horns, and is of a firmer texture than any of the other. It grows naturally in Spain and the South of France, flowering from June to September.

There is a variety with double flowers.

The fifth rises with a branching stalk a foot and a half high; with pretty long leaves, finely divided: the flowers are produced at the end of the branches: the petals are yellowish; at the base of these are placed eight nectaries, between

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1 *Nigella Damascena.*
Love in a mist. Devil in a bush.

2 *Narcissus Jonquilla.*
Jonquill

which arise a great number of stamens, with an unequal number of germs, from five to eight or nine, oblong and compressed: the capsules are joined together on their inner side, terminate in horns, open longitudinally, and contain many thin compressed seeds, having borders round them. It is a native of Syria, flowering from July to September.

Culture.—They are all increased by sowing the seeds on light earth where the plants are to remain, as they seldom succeed well when transplanted in patches at proper distances; and when the plants are come up, they should be thinned, leaving only three or four in each patch, keeping them afterwards clear from weeds.

The best season for sowing is March; but if some be sown in August, soon after they become ripe, on a dry soil and in a warm situation, they will abide the winter, and flower strong the succeeding year. By sowing the seeds at different times, they may be continued in beauty most part of the summer season.

As they are all annual plants, they require to be raised every year.

The varieties with double flowers are chiefly introduced into flower gardens.

They afford ornament and variety among other annuals in the clumps and borders.

NIGHTSHADE. See SOLANUM.

NOLANA, a genus containing a plant of the herbaceous trailing annual kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Asperifoliæ*, or *Luridæ*.

The characters are: that the calyx is a one-leafed perianthium, turbinate at the base, five-parted, five-cornered: segments cordate, acute, permanent: the corolla is one-petalled, bell-shaped, plaited, spreading, somewhat five-lobed, twice as large as the calyx: the stamina have five awl-shaped filaments, erect, equal, shorter than the corolla: anthers sagittate; the pistillum is as five roundish germs: style among the germs, cylindric, straight, the length of the stamens: stigma capitate: the pericarpium properly none: (drupes five, decumbent, three- or five-celled:) the seeds five, with a succulent rind, roundish, with the inner base naked, immersed in the receptacle, two-celled and four-celled (solitary).

The species is *N. prostrata*, Trailing Nolana.

It has an annual root, simple, filiform, often three feet long, blackish: the stem a foot long, herbaceous, prostrate, roundish, very smooth, with white dots scattered over it: the branches alternate, the lower ones the length of the stalk: the leaves alternate, two together, reflex, rhomb-ovate, quite entire, blunt, somewhat fleshy, an inch long, somewhat papulose, even, flat, veined, unequal, alternately larger and smaller. According to Miller they come out single at some joints, by pairs at others, and frequently three or four at the upper joints: the petioles ancipital, scarcely shorter than the leaves, smooth, those belonging to the upper leaves vaguely ciliate: the peduncles lateral, solitary, spreading a little, an inch long, one-flowered, round, thicker at top, hairy: the flowers inferior. It is a native of Java.

Culture.—These plants may be raised by sowing the seeds on a hot-bed in March. When the plants are fit to remove, they should be planted out singly into small pots filled with light earth, plunging them into a fresh hot-bed to bring them forward. When their flowers open in the summer, as July, they should have a large share of air admitted when the weather is warm, to prevent their falling away without producing seeds. Under this management the plants often continue flowering till the early frosts destroy them, and ripe seeds are produced in the beginning of the autumn.

They afford variety among other tender annuals.

NOLI ME TANGERE. See IMPATIENS.

NONE-SO-PRETTY. See SAXIFRAGA.

NOSE-BLEED. See ACHILLEAS.

NUCIPERSICA. See AMYGDALUS.

NURSERY, a portion of ground set apart for the raising and nursing various sorts of trees, shrubs, and herbaceous plants to proper states of growth for supplying the different gardens, orchards, plantations, and other departments.

In these situations are raised all the different sorts of fruit-trees, and fruit-bearing shrubs, by nursing and training them up to proper sizes and growths for planting where they are to remain to produce their fruit, as well as the vast train of forest-trees, hardy ornamental trees, and deciduous and ever-green shrubs, training them up properly for the purposes for which they are designed in plantations and pleasure-grounds.

And various sorts of hardy herbaceous plants, both of the fibrous-, bulbous-, and tuberous-rooted kinds may be here provided in proper states for being planted out.

These different sorts of plants are raised by seed, suckers, layers, cuttings, slips, off-sets, parting the roots, grafting, budding, &c. as directed under their several heads.

And as some of the various sorts are drawn off annually, to supply different situations, a fresh supply of young plants should be accord-

ingly raised every year in the Nursery, of most of the various kinds, so as to have it always fully stocked with most kinds in different states of growth; some in seed-beds, others transplanted in nursery-rows; some one year, others two, three, or several years: all of which should be well attended to, that there may be a sufficiency of plants of all sorts for furnishing every different department of gardening as they may be wanted.

In public Nursery-grounds, it is customary to have convenient green-houses, glass-cases, and stoves, with their proper appendages, for raising tender exotics from the warmer parts of the globe, which are always placed in the warmest and most sunny situations, having their fronts directly facing the south, to have all possible benefit from the sun's influence; which serve for raising and nursing the various tender plants to a proper growth for furnishing other larger conservatories, green-houses, &c.

Size, Soil, and Situation. In respect to the extent or dimensions of Nursery-grounds, they should be according to the quantity of plants required, or the demand for sale: if for private use, from a quarter or half an acre to five or six may be proper, which should be regulated according to the extent of the garden-ground and plantations they are required to supply; and if for public or general cultivation, not less than three or four acres of land will be worth occupying, and from that to fifteen or twenty acres, or more, may be requisite, in proportion to the demand.

The soil for Nursery-grounds should be of different qualities, in order that it may suit different sorts of trees and plants.

Nursery-men generally prefer a loamy soil of a moderately light nature: however, they may be formed of any good moderately light land, that has fifteen or eighteen inches depth of good working soil, but if two or three spades deep it will be the better; and where there is scope of ground to choose from, that where there is a good depth, and a naturally rich or good soil, should be preferred, as the soil of a Nursery cannot be too good, notwithstanding what has been advanced to the contrary; as where the soil is poor and lean, the plants are mostly languid, weak, and stunted, no art being able to improve them; while those raised in a good mellow soil always assume a free growth, and advance with strength and vigour. It is not requisite, however, that the soil should be very rich, nor over manured: a medium between the two extremes is the most proper, such as good mellow pasture land, having the sward trenched to the bottom, which is excellent for the growth of trees; and any similar eligible soil of corn-fields is also extremely proper: any other good soil of the nature of common garden-earth is likewise well adapted for a Nursery-ground.

As to situation; where it is rather low than high it is better, as being naturally warmer, and more out of the power of cutting and boisterous winds than a higher situation, though where some parts of the ground are high and others low, it may be an advantage, in better suiting the nature of the different plants. It is also of vast advantage to have Nursery-grounds fully exposed to the sun and free air, and, if possible, where there is the convenience of having water for the occasional watering of young seedlings, and newly removed plants.

When for private use, where there is room, Nursery-grounds may either be entirely detached, or contiguous to the outer boundaries of the shrubbery plantations of the pleasure-ground, and so contrived as to lead insensibly into it by winding walks, so as to appear part of the garden or shrubbery.

Method of inclosing, preparing, and laying out. In respect to the outside fence, it may either be a hedge and ditch, or a paling; the former is the cheapest, and most durable; though where hares and rabbits abound paling fences are most eligible.

Paling, or other similar close fence, is however in general, for some part, extremely useful to train young wall-trees to a proper growth for garden-walls, &c.

After thus fenced in, the ground should be all regularly trenched over one or two spades deep, according to the natural depth of the soil; after which, proceed to divide it by walks into quarters, and other parts; letting a principal walk lead directly through the middle or some principal part, which may be from five to eight or ten feet wide, according to circumstances, having a broad border on each side: another walk should be carried all round next the outward boundary, four or five feet wide, leaving an eight or ten feet border next the fence all the way; dividing the internal part by smaller cross walks, so as to form the whole into four, six, or eight principal divisions.

One or more of these divisions should be appropriated for the reception of all sorts of seeds, for raising plants to furnish the other parts; subdividing it into four feet wide beds, with foot-wide alleys at least between bed and bed. In these beds should be sown seeds, &c. of all such trees, shrubs, and herbaceous plants as are raised from seed; and which should

contain the various sorts of kernels and stones of fruit, to raise stocks for grafting and budding upon, as well as the seeds of forest-trees, ornamental trees, shrubs, &c. and of numerous herbaceous perennials, of the fibrous and bulbous-rooted tribes

The season for sowing is both spring and autumn, according to the nature of the different sorts, as may be seen under their different heads. When the young tree and shrub seedling-plants thus raised are one or two years old, they should be planted out in Nursery-rows into the other principal divisions, but many kinds of herbaceous plants require to be pricked out from the seed-beds when only from two to three or four months old. And, on the contrary, most kinds of bulbous seedlings will not be fit for planting out in less than one or two years at the shortest periods.

Another part of these grounds should be allotted for stools of various trees and shrubs, for propagation by layers, by which vast numbers of plants of different kinds may be raised. These should be strong plants set in rows three or four feet distance every way: such of them as naturally rise with tall stems, after being planted one year, are headed down near the ground, to force out many lower shoots conveniently situated for laying them down. See STOOLS and LAYING.

The cuttings, suckers, slips, off-sets, &c. of hardy trees, shrubs, and plants, may be planted out in any convenient part of the ground in shady borders, &c.; but for the more tender kinds, some warm sheltered situation should be provided.

The other principal divisions of these grounds should be left for the reception of various sorts of seedling plants from seminary quarters; as well as for those that are raised from suckers, layers, cuttings, &c. to be planted in rows from one to two or three feet asunder, according to their natures and growths, allowing the tree and shrub kinds treble the distance of the herbaceous perennial sorts. Of the tree and shrub kinds some are to be planted for stocks to graft and bud the select sorts of fruit-trees and other choice plants upon, that are usually propagated by such methods; others should be trained up entirely on their own roots without budding and grafting, as in most forest and other hardy tree kinds; as well as almost all the sorts of shrubs.

It is also proper to have some dry warm sheltered situation in the full sun in these grounds, for occasional hot-beds of dung or tan, for raising and forwarding many sorts of tender or curious exotics by seed, cuttings, suckers, slips, &c. which should be furnished with suitable frames and lights, hand-glasses, garden-mats, and other requisites for that sort of culture.

Methods and Times of Stocking with Plants. The particular modes of cultivation are fully explained under the different heads of the plants, and the operations that are necessary in raising them to the best advantage.

As to the seasons for performing the works of sowing, planting, &c. they are different in different kinds, but the autumn and spring are the principal seasons: for planting out or removing, the principal season is about October and in April, for tender kinds, especially the evergreen tribe; but most other hardy trees and shrubs may be transplanted any time in winter, in open mild weather. The nature of the soil should, however, be regarded in this business.

The hardy herbaceous fibrous-rooted plants may be removed almost any time, either in autumn or spring, and many sorts even in the summer. But for the older or larger plants, the autumn or very early spring are the best periods, which are the only proper seasons for dividing or slipping the roots of all these kinds for further increase.

And for the bulbous and such tuberous roots whose leaves, like most of the bulbous tribe, decay in the summer, the proper season for planting or removing them is the spring and summer months, when their flower-stalks decay, as well as to separate their off-sets for increase; which may either be planted again directly, or kept out of ground one, two, or several months, though it is proper to plant the principal part again in autumn, unless where retained for sale, &c.

The succulent perennial sorts may be removed almost any time in the spring, summer, or early autumn, but the last is the best. But most kinds of succulent cuttings succeed best when planted in the summer season.

Methods of disposing the Plants.—In the distribution of the different sorts in these grounds, each should be separate: the fruit- forest trees, &c. occupying spaces by themselves nearly together; all the shrub kind should also be ranged in separate places, allotting suitable spots for herbaceous perennials and tender plants, defended with yew or privet hedges, or a reed fence, &c. in which may be set such plants, in pots, as are a little tender whilst young, and require occasional shelter from frost, but not so tender as to require to be housed as green-house plants, &c. And in such places, frames of various sizes may be placed, either to be covered occasionally with glass lights, or

with mats, to contain some of these more choice tender kinds in pots, to be nursed a year or two, or longer, with occasional shelter, till gradually hardened to bear the open air.

The arrangement of all the sorts in the open grounds should always be in lines or nursery-rows, as already suggested; placing the fruit-tree stocks, &c. for grafting and budding upon, in rows two feet asunder, when for dwarfs; but for standards two feet and a half, and a foot and a half in the lines. But as after being grafted and budded they become fruit-trees, &c. where they are to stand to grow to any large size, they should be allowed the width of a yard between the rows. Forest-trees should also be placed in rows from two to three feet asunder, and half that distance in the rows; varying the distance both ways, according to the time they are to stand: the shrub kind should likewise be arranged in rows about two feet asunder, and fifteen or eighteen inches distant in each line; and as to the herbaceous plants, they may generally be disposed in four-feet-wide beds, or large borders, in rows, or distances, from six to twelve or eighteen inches asunder, according to their nature of growth, and time they are to stand or remain in them.

By this mode of arrangement, a great number of plants are included within a narrow compass, but which is sufficient, as they are only to remain a short time; and besides, they are more readily kept under proper regulation.

In public grounds of this sort, many kinds of seedling-trees and shrubs are planted out often in much closer rows at first than these, not only in order to husband the ground to the best advantage, but by standing closer it encourages the stem to shoot more directly upward, and prevent their expanding themselves much any where but at top; as for instance, many sorts of ever-greens that are of slow growth the first year or two, such as the pine-trees, firs, and several others; which the nursery-gardeners often prick out from the seminary, first into four feet-wide beds, in rows lengthways, six inches asunder; and after having one or two years growth here, transplant them in rows a foot asunder; and in a year or two after, give them another and final transplantation in the Nursery, in rows two or three feet asunder, as above: these different transplantings encourage the roots to branch out into many horizontal fibres, and prepare them better for being finally planted out.

The various sorts of Nursery-plants, after being raised in some of the above methods, are sometimes pricked out by dibble, in other cases put in by the spade, either by trenches, slitting-in, trenching, or holing; and some are drilled in by a spade or hoe, according to the kinds.

Sometimes young seedling-trees and shrubs are pricked out from the seminary by dibble; sometimes put in by the spade in the following methods: first, having set a line to plant by, the spade is stricken into the ground with its back close to the line, and another stroke given at right angles with it; then a plant set into the crevice made at the second stroke, bringing it close up into the first-made crevice even with the line, pressing the mould close to it with the foot; then proceeding to plant another in the same way, and so on.—A second method, for plants with rather larger roots, is to strike the spade down with its back close to the line, and then cut out a narrow trench with it close along the line, making the side next the line perfectly upright, placing the plants upright against the back of the trench close to the line, at the proper distances; and as the work proceeds, trimming in the earth upon their roots: when one row is thus planted, the earth should be trodden gently all along close to the plants; and then proceed to plant another row in the same manner. Another method of planting out small tree and shrub plants is, after having set the line as above, to turn the spade edgeways to the line, casting out the earth of that spit, then a person ready with plants, setting one in the cavity close to the line, and directly taking another such spit, turning the earth in upon the roots of the plant, and then placing another plant into the second cut, covering its roots with the earth of a third spit, and so on to the end: but sometimes, when the roots are much larger, holes are made along by the line wide enough to receive the roots freely every way, covering them in as above, as the work proceeds, always pressing the earth gently with the foot close to the roots, and closing it about the stems, to settle the plants firmly in their proper positions.

Fibrous-rooted herbaceous plants are mostly planted with a dibble, except when the roots are large and spreading, or such as are removed with balls of earth; when they are more commonly planted by holing them in with a garden trowel, or small spade for the purpose.

But bulbous and tuberous-rooted plants, such as lilies, tulips, anemones, ranunculuses, &c. are commonly planted with a dibble, and many sorts may be planted in drills drawn with a hoe.

They are also sometimes planted, by raking or trimming the earth from off the top of the beds

Painted by Syd Edwards London Published Apr 1 1806 by G.Kearsley Fleet Street Engraved by F.Sansom

1 *Nelumbium speciosum* Chinese Water Lily

2 *Nolana prostrata* Trailing Nolana

from about three to four or five inches deep, into the alleys, then placing the roots in rows upon the surface, thrusting the bottoms a little into the ground, and immediately covering them with the earth which was drawn off into the alleys, spreading it evenly over every part, so as to bury all the roots to an equal depth in the soil.

The tender kinds of exotic plants, that require occasional shelter whilst young, should many of them be potted, in order for moving to warm situations in winter; or some into frames, &c. to have occasional shelter from frost, by glasses or mats, as they may require; hardening them, however, by degrees to bear the open air fully in the Nursery the year round. And the most tender kinds, that require the aid of a green-house or stove, should all be potted, and placed in their proper situations. See GREEN-HOUSE and STOVE PLANTS.

General Culture of the Plants.—In the management of the various hardy Nursery-plants, those intended as stocks or fruit-trees, should have their stems generally cleared from lateral shoots, so as to form clean straight stems, but never to shorten the leading shoot, unless it is decayed, or becomes very crooked, in which case it may be sometimes proper to cut it down low in spring, to shoot out again, training the main shoot for a stem, with its top entire, till grafted or budded. See GRAFTING, BUDDING, and TRAINING.

But in the culture of the fruit-tree kind, the sorts designed for principal wall-trees, particularly such as peaches, nectarines, apricots, &c. should, when of one year's growth from grafting and budding, be planted against some close fence, as a wall, paling, reed-hedge, &c. and their first graft or bud-shoot headed down in the spring, to promote an emission of lower lateral shoots and branches, in order to be regularly trained to the fence in a spreading manner for two or three years, or till wanted, to form the head in a regular spreading growth, which in public grounds of this kind should always be ready in proper training, to supply those who may wish to have their walls covered at once by such ready trained trees. And a similar training, both for wall and espalier fruit-trees, may be practised with some principal sorts in the Nursery-rows in the open quarters of the ground, by directing their branches, in a spreading manner, to stakes placed for the purpose.

Standard fruit-trees should only be trained with a clean single stem, five or six feet for full standards, by cutting off all lateral shoots arising below: half-standards should be trained with three- or four-feet stems, and dwarf standards in proportion by the same means.

The heads of the standards in some may be directed by having the first immediate shoots from the graft or bud, when a year old, pruned short in spring, to procure lateral shoots, in order to form a fuller spread of branches, proceeding regularly together from near the summit of the stems, and thus give a more regular branchy growth to them.

Forest-trees should, in general, be encouraged to form straight clean single stems, by occasional trimming off the largest lateral branches, which also promotes the leading top-shoots in rising straight, and faster in height; always suffering that part of each tree to shoot at full length; that is not to top it, unless where the stem divides into forks, when the weakest should be trimmed off, and the straightest and strongest shoots or branches left to shoot out at their proper length to form the aspiring tops.

The different sorts of shrubs should mostly be suffered to branch out in their own natural way, except merely regulating very disorderly growths; and some sorts may be trained with single clean stems, from about one foot to two or three high, according as may be thought proper. But shrubs in general appear the most agreeable when permitted to shoot out laterally all the way, so as to be branchy or feathered to the bottoms of the stems.

The fruit-trees in each species should, as soon as grafted or budded, have all the different varieties numbered, by placing large flat-sided sticks at the ends of the rows, for which purpose the spokes of old coach-wheels, or any thing about that size of any durable wood, answers very well, painting or marking upon them the numbers, and entering them in the Nursery-book, with the name of the varieties to which the number-sticks are placed; by which, at all times, a ready recourse may be had to the sorts wanted.

And it is useful to employ the same means to trees, shrubs, and herbaceous plants, especially the varieties of particular species, when they are numerous, such as in many of the flowery tribes; as auriculas, carnations, tulips, anemones, ranunculuses, &c.

Watering Nursery-plants is very requisite in dry hot weather, in spring and summer; such as seed-beds and tender seedling-plants, while young, and when first planted out, till they have taken good root; also, occasionally, to new-layed layers and newly-planted cuttings in dry warm weather; but as to hardy trees and shrubs of all sorts, when planted out at the proper time, as not too late in the spring, no great regard need be paid

in this respect, as they generally succeed very well without.

The next business is, in every winter or spring, to dig the ground between the rows of all sorts of transplanted plants in the open Nursery-quarters, a practice which is particularly necessary to all the tree and shrub kinds that stand wide enough in rows to admit the spade between them; this work is by the Nursery-men called *turning-in*; the most general season for which is any time from October or November until March; but the sooner it is done the more advantageous it will be to the plants. The ground is to be dug only one spade deep in these cases, proceeding row by row, turning the top of each spit clean to the bottom, that all weeds on the top may be buried a proper depth. It is a most necessary annual operation, both to destroy weeds, and to increase the growth of the young plants.

And in the summer season great attention is necessary to keep all sorts clean from weeds; the seedlings growing close in the beds must be hand-weeded; but among plants of all sorts that grow in rows wide enough to admit the hoe, it will prove not only most expeditious, but, by loosening the top of the soil, promote the growth of all kinds of plants. It should always be performed in dry weather, and before the weeds grow large. See HOE and HOEING.

As soon as any quarter or part of these grounds are cleared from plants, others must be introduced in their room from the seminary; the ground being previously trenched over for the purpose, giving it the addition of manure if necessary.

It is supposed by some to be of advantage to plant the ground with plants of a different kind from those which occupied it before; but this is probably not very material.

The tender or exotic plants of all kinds that require shelter only from frost whilst young, and by degrees become hardy enough to live in the open air, should, such of them as are seedlings in the open ground, have the beds arched over with hoops, or rods, at the approach of winter, in order to be sheltered with mats in severe weather; and those which are in pots, either seedlings or transplanted plants, should be removed in October in their pots to warm sunny situations sheltered with hedges, &c. placing some close under the fences facing the sun, where they may have occasional covering of mats in frosty weather; others that are more tender being placed in frames, to have the occasional covering either of glass-lights or mats, &c. observing that they are gradually to be hardened to the open ground, and need only be covered in frosty weather; at all other times they should remain fully exposed, and, by degrees, as they acquire age and strength, become inured to bear the open air fully; so as when they arrive at from two or three to four or five years old, they may be turned out into the open ground.

The stove and green-house kinds must be managed according to the directions given under these heads. See GREEN-HOUSE PLANTS.

NUT, BLADDER. See STAPHYLÆA.

NUT, CASHEU. See ANACARDIUM.

NUT, COCOA. See COCOS.

NUT, MALABAR. See JUSTICIA.

NUT, PHYSIC. See JATROPHA.

NUT-TREE. See CORYLUS.

NYCTANTHES, a genus containing plants of the shrubby exotic flowering kind.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Sepiariæ*.

The characters are: that the calyx is a one-leafed perianthium, tubular, truncate, quite entire, permanent: the corolla one-petalled, salver-shaped: the tube cylindric, the length of the calyx: border five-parted, spreading, with the lobes two-lobed: the stamina have two filaments in the middle of the tube, very short: anthers oblong, the length of the tube: the pistillum is a superior germ, subovate: style filiform, the length of the tube: stigmas two, acute: the pericarpium is an obovate capsule, compressed, with an emarginate dagger-point, coriaceous, two-celled, bipartile: cells parallel, appressed, valveless: the seeds are solitary, obovate, convex on one side, flat on the other, fastened to the bottom of the cell.

The species cultivated is: *N. arbor tristis*, Square-stalked Nyctanthes. Other species may be cultivated for variety.

It is a shrub, with four-cornered, rugged branches: the leaves are opposite, petioled, ovate, oblong, quite entire, longer than the branch-joints, rugged on both sides: the pedunculs axillary, opposite, solitary, four-cornered, shorter by half than the leaf, two-leaved at top, with three-flowered pedicels: the partial involucre four-leaved? the leaflets are obovate, the length of the calyxes, blunt, containing three sessile florets: the corolla funnel-shaped, with a six- or eight-cleft border: the capsule coriaceous, superior, obcordate or obovate, turgidly lenticular, in the twin, middle ventricose and marked with a longitudinal elevated streak, compressed at the sides into a narrow sharp margin, the rest brittle, two-celled, bipartile; with the segments plano-convex, of a brown chestnut

colour on the outside, pale within, quite entire, valveless. It is a native of the East Indies.

Culture.—It may be increased by layers and cuttings. The layers may be laid down in the early part of the summer, in the usual method, being made from the young branches, plunging the pots containing them in a bark hotbed.

The cuttings should be taken from the young shoots, be planted out at the same time, and managed in the same manner.

The plants, when fully rooted in either way, may be removed into separate pots. They should have due supplies of water, and be pruned and removed into larger pots as there may be occasion.

They are very ornamental and fragrant among other potted tender plants.

NYMPHÆA, a genus comprising plants of the herbaceous flowery aquatic kind.

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is an inferior perianthium, four-, five-, or six-leaved, large, coloured above, permanent: the corolla has numerous petals (often fifteen) placed on the side of the germ, in more than one row: the stamina have numerous filaments (often seventy) flat, curved, blunt, short: anthers oblong, fastened to the margin of the filaments: the pistillum is an ovate germ, large: style none: stigma orbiculate, flat, peltate-sessile, rayed, crenate at the edge, permanent: the pericarpium is a hard berry, ovate, fleshy, rude, narrowed at the neck, crowned at the top, many-celled, (cells from ten to fifteen) full of pulp: the seeds very many, and roundish.

The species are: 1. *N. lutea*, Yellow Water Lily; 2. *N. alba*, White Water Lily; 3. *N. Lotus*, Egyptian Water Lily; 4. *N. nelumbo*, Peltated Water Lily.

The first has the leaves smooth, plane, except that they turn up a little at the edge to keep off the water, tough and pliant, ten or twelve inches in diameter, floating, ovate or nearly orbicular, bright green above, paler underneath, with branched raised nerves or veins: the petioles are smooth, three-sided, their length depending on the depth of water, sometimes five feet and a half in length. The case is the same with the peduncle, which always elevates the flower above the water; but after it is impregnated, the seeds are ripened under water, and fall into the mud at bottom to produce new plants: the peduncles are round, succulent, and one-flowered: the flowers an inch and half in diameter, having a vinous smell. It is a native of most parts of Europe, flowering in July and August.

The second species has a tuberous root, frequently the size of the human arm, creeping far and wide and deep in mud: the whole plant is larger in all its parts than the first: the leaves are much the same, only larger: the petioles and peduncles round, within full of pores, four of which are generally larger than the rest; hairs interwoven between: the flowers large, being sometimes six inches in diameter, very handsome and double.

According to Linnæus, the flower raises itself out of the water and expands about seven o'clock in the morning, and closes again, reposing upon the surface, about four in the evening. It is a native of most parts of Europe, flowering in July and August.

The third resembles the second very much in the form of the flower and leaves, but the latter are toothed about the edge. It is a native of the hot parts of the East Indies, Africa, and America, flowering about the middle of September near Cairo, in Lower Egypt. The Arabians call it Nuphar. A bread was formerly made of the seed when dried and ground.

The fourth species has a horizontal root, long, creeping, consisting of joints linked together, ovate-oblong, white, fleshy, esculent, tubular within: the leaves exactly peltate, with a cavity in the centre above, and dichotomous veins springing from the same centre, orbiculate, with a point on each side, a little waved, thin, paler underneath, smooth, of different sizes, from four to twelve inches: the petioles erect, very straight, round, hispid or muricated, thicker below, attenuated above: the peduncle the thickness of a finger below, attenuated above, spongy, muricated, one-flowered: the flowers as large as the palm of the hand, or larger, purple. It is a native of the Indies, &c.

The Chinese have the roots not only served up in summer with ice, but laid up in salt and vinegar for winter: the seeds are somewhat of the size and form of an acorn, and of a taste more delicate than that of almonds: the ponds in China are generally covered with it, and exhibit a very beautiful appearance when it is in flower; and the flowers are no less fragrant than handsome.

Culture.—The two first sorts may be best increased by procuring some of their seed-vessels just as they become ripe and ready to open, and throwing them into canals, ponds, ditches, or other standing waters, where the seeds, sinking to the bottoms, afford plants in the following spring floating upon the surface of their waters.

When they have been once fixed to the place in this way, they multiply greatly, so as to cover such places in a short time.

They are also capable of being cultivated in large troughs or cisterns of water, having earth at the bottoms, flourishing very well, and producing annually large quantities of flowers.

The third and fourth species, as being tender, should be kept in such troughs or cisterns, and be set in a corner of the stove. In their native situations they are increased both by their roots and seeds as the common sorts in this climate.

NYSSA, a genus containing a plant of the aquatic ornamental tree kind.

It belongs to the class and order *Polygamia Dioecia*, and ranks in the natural order of *Holoraceæ*.

The characters are: that in the male the calyx is a five-parted perianthium, spreading, with a plane bottom: there is no corolla: the stamina have ten awl-shaped filaments, shorter than the calyx: anthers twin, the length of the filaments: hermaphrodite—the calyx is a perianthium as in the male, sitting on the germ: there is no corolla: the stamina have five awl-shaped filaments, erect: anthers simple: pistillum is an ovate germ, inferior: style awl shaped, curved inwards, longer than the stamens: stigma acute: the pericarpium is a drupe: the seed is an oval nut, acute, scored with longitudinal grooves, angular, irregular.

The species are: 1. *N. integrifolia*, Mountain Tupelo; 2. *N. denticulata*, Water Tupelo.

The first rises with a strong upright trunk to the height of thirty or forty feet, and sometimes near two feet in diameter; sending off many horizontal, and often depending branches: the leaves are obovate, a little pointed, entire, of a dark green and shining upper surface, but lighter and a little hairy underneath: those of the male trees are often narrower and sometimes lance-shaped. The flowers are produced upon pretty long common footstalks, arising from the base of the young shoots, and dividing irregularly into several parts, generally from six to ten, each supporting a small flower, having a calyx of six or seven unequal leaves, and from six to eight awl-shaped spreading stamens, supporting short four-lobed anthers: the female trees have fewer flowers produced upon much longer simple cylindrical footstalks, thickened at the extremity, and supporting generally three flowers, sitting close, and having a small involucre. They are composed of five small oval leaves, and in the centre an awl-shaped incurved style, arising from the oblong germ, which is inferior, and becomes an oval oblong berry, of a dark purplish colour when ripe: the timber is close-grained, and curled so as not to be split or parted; and therefore much used for wheels, &c. It grows naturally in Pennsylvania, and perhaps elsewhere.

The second species rises with a strong upright trunk to the height of eighty or a hundred feet in its native situation, dividing into many branches towards the top: the leaves are pretty large, of an oval-spear-shaped form, generally entire, but sometimes somewhat toothed, and covered underneath with a whitish down: they are joined to long slender footstalks, and affixed to the branches in somewhat of a verticillate order, presenting a beautiful varied foliage: the berries are near the size and shape of small olives, and are preserved as that fruit is by the French inhabitants upon the Missisippi, where it greatly abounds, and is called the Olive-tree: the timber is white, and soft when unseasoned, but light and compact when dry, which renders it very proper for making trays, bowls, &c. It grows naturally in wet swamps, or near large rivers, in Carolina and Florida.

Culture.—These trees may be increased by sowing the seeds procured from the places where they grow naturally, putting them into the ground as soon as they are procured, as they lie long before they vegetate.

They should be sown in pots filled with light loamy earth, placing them where they may have only the morning sun; and during the first summer the pots should be kept clean from weeds, being well watered in dry weather. The pots should be plunged into the ground in the following autumn; and, if the winter prove severe, cover them with old tan, peas-haulm, or other similar light covering. And in the following spring they should be plunged into a moderate hot-bed, hooped and covered over with mats; keeping the earth constantly moist.

By this means the plants are brought up in the spring, when they should be gradually hardened to bear the open air; and during the following summer, the pots again plunged into an eastern border, watering them in dry weather, carefully removing them into a frame in the autumn, where they may be screened from frost; but in mild weather be exposed to the open air. In the spring following, before they begin to shoot, they should be parted carefully, planting each in a small pot filled with loamy mould; and when they are plunged into a moderate hot-bed, it will promote their putting out new roots; after which they may be plunged in an eastern border, and be sheltered again in winter under a frame. In the third spring, such plants as have made

the greatest progress may be planted out in a loamy soil, in a sheltered situation, where they may be capable of enduring the cold of this climate. They make the greatest progress where the soil is inclined to be moist.

They may likewise be propagated by layers and cuttings, planted out in the autumn or spring in the usual manner.

The plants afford ornament and variety in shrubbery and other parts, where the ground is of a moist quality.

OAK. See QUERCUS.

OAK JERUSALEM. See CHENOPODIUM.

OCIMUM, a genus containing plants of the tender herbaceous aromatic annual kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leafed perianthium, two-lipped, very short, permanent: upper-lip flat, orbiculate, wider, ascending: lower-lip four-cleft, acute, converging: the corolla is one-petalled, ringent, resupine: tube very short, spreading; one lip turned upwards, wider, half-four-cleft, blunt, equal; the other lip turned downwards, narrower, entire, serrate, longer: the stamina have four filaments, declined; two a little longer, and two putting forth a reflex process at the base: anthers half-mooned: the pistillum is a four-parted germ: the style filiform, situation and length of the stamens: stigma bifid: there is no pericarpium: calyx closed, cherishing the seeds: the seeds four, ovate.

The species cultivated are: 1. *O. Basilicum*, Common Sweet Basil; 2. *O. minimum*, Bush Basil; 3. *O. tenuiflorum*, Slender-spiked Basil.

The first has the stem suffruticose, three feet high (a foot and half), erect, round, tomentose; with straight, ascending branches: the leaves somewhat acute, serrate, pubescent, brownish-red, waved, petioled, smelling like cloves: the flowers are white, small, in long, upright, terminating spiked racemes. The whole plant has a strong scent of cloves. It is a native of the East Indies, flowering in July and August.

There are varieties with purple fringe-leaves; with green fringe-leaves; green with studded leaves; and the Large-leaved Basil.

The middle-sized variety, or that which is used in the kitchen, especially in French cookery, rises about ten inches high, sending out opposite, four-cornered branches from the very bottom: the leaves are ovate-lanceolate, ending in acute points, indented on their edges. The whole plant is hairy, and has a strong scent of cloves, which to some is very agreeable.

The chief sub-varieties of which are: the Common Basil, with very dark green leaves and violet-coloured flowers; the Curled-leaved Basil, with short spikes of flowers; the Narrow-leaved Basil, smelling like fennel; the Middle Basil, with a scent of citron; the Basil with studded leaves; and Basil with leaves of three colours.

The second species is a low bushy plant, seldom more than six inches high, branching from the bottom, and forming an orbicular head: the leaves small, smooth, on short footstalks: the flowers in whorls towards the top of the branches, smaller than those of the first sort, and seldom succeeded by ripe seeds in this climate. It is a native of the East Indies, annually flowering in July and August.

There are varieties with black purple leaves, and with variable leaves.

The third has the stem from one to two feet high, roundish, purple, brachiate, having spreading hairs scattered over it: the branches shorter: the leaves bluntly serrate, soft, on long petioles: the spikes terminating, in threes, long, narrow, peduncled; with opposite, smooth, bractes, closely reflex: the flowers three from each bracte, subsessile, which are so small as scarcely to be visible to the naked eye: they begin to open from the top of the spike. It is a native of Malabar, &c.

Culture.—They are all capable of being increased by sowing the fresh seeds in the latter end of March, upon a moderate hot-bed, covered to the depth of five or six inches with good light mould, putting them in a quarter of an inch deep, fresh air being given daily, and slight waterings occasionally. When the plants have attained a few inches in growth they should be pricked out upon another hot-bed four inches apart, or set in pots

of a small size, plunging them in the hot-bed, water and occasional shade being given till fresh rooted, with fresh air and water in small proportions afterwards. In the latter end of the spring or beginning of summer, they should be begun to be hardened, and in the hot weather set out in the open air where wanted. Some may be set out in the borders in the open ground, a slight watering being given at the time.

In order to obtain good seeds, a few of the potted plants should be placed in a good greenhouse or glass case in the latter end of the summer, fresh air being freely admitted.

The first sort and varieties are often used as culinary herbs, and all the sorts may be set out among other potted plants in rooms and windows, especially the bush sort, as well as in the borders and clumps for ornament and variety.

OENOTHERA, a genus containing plants of the herbaceous, biennial, perennial and under shrubby perennial kinds.

It belongs to the class and order *Octandria, Monogynia*, and ranks in the natural order of *Calycanthemæ*.

The characters are: that the calyx is a one-leafed, superior, deciduous perianthium: tube cylindrical, erect, long, deciduous: border four-cleft: the segments oblong, acute, bent down: the corolla has four petals, obcordate, flat, inserted into the interstices of the calyx, and the same length with the divisions of the calyx: the stamina have eight awl-shaped filaments, curved inwards, inserted into the throat of the calyx, shorter than the corolla: anthers oblong, incumbent: the pistillum is a cylindrical germ, inferior: style filiform, the length of the stamens: stigma four-cleft, thick, blunt, reflex: the pericarpium is a cylindrical capsule, four-cornered, four-celled, four-valved, with contrary partitions: the seeds very many, angular, naked: the receptacle columnar, free, four-cornered, with the angles contiguous to the margin of the partitions.

The species cultivated are: 1. *O. biennis*, Broad-leaved Tree-Primrose; 2. *O. longiflora*, Long-flowered Tree-Primrose; 3. *O. mollissima*, Soft Tree-Primrose; 4. *O. fruticosa*, Shrubby Tree-Primrose; 5. *O. pumila*, Dwarf Tree-Primrose.

The first has a biennial fusiform fibrous root, yellowish on the outside, white within: from this, the first year, arise many obtuse leaves, which spread flat on the ground; and from among which, the second year, the stems come out, three or four feet high, upright, of a pale green colour, the thickness of a finger, not hollow but pithy, angular, slightly pubescent and rugged, tinged with purple, especially towards the bottom, branched alternately almost from the ground: the root-leaves run down into a three-sided petiole an inch in length: the stem-leaves sessile, bright lightish green, pubescent on both sides, waved a little about the edge, and having a few small teeth near the base: they are from five to seven inches in length and two inches in breadth, having a considerable midrib running the whole length, very wide and tinged with purple towards the base, at the back very prominent, with white nerves springing from it, and curved towards the point: the flowers are produced all along the stalks on axillary branches, and in a terminating spike: the leaves on the former are similar to the stem-leaves, but much smaller, being not more than two inches long, and little more than half an inch in breadth: the flowers are solitary, each being separated by a leaflet or bracte, wider in proportion at the base than the proper leaves, and drawn more to a point, diminishing gradually towards the top of the spike, till they become linear, scarcely half an inch in length, and a line in breadth.

It is observed that the flowers usually open between six and seven o'clock in the evening, whence the plant is called Evening or Night-Primrose: the uppermost flowers come out first in June, the stalk keeping continually advancing in height, and there is a constant succession of flowers till late in autumn. It is a native of North America. The roots are said to be eaten in some countries in the spring season.

The second species has also a biennial root: the root-leaves are numerous, broad-lanceolate, toothletted, pubescent, with a white rib, obliquely nerved: the stems usually five, springing out below the root-leaves, quite simple, ascending, rough-haired, green with long spreading white hairs: the central stem grows up later: the stem-leaves are ovate-oblong, sessile, like the root-leaves: the flowers axillary from the upper leaves, with the germ and calyx hairy. It is remarked by Curtis, that luxuriant specimens exceed five feet in height, that the flowers are uncommonly large and showy, and continue blowing from July to October. It is a native of Buenos Ayres.

The third has a shrubby stalk more than two feet high, hairy, with narrow-lanceolate sessile leaves, a little waved on their edges, and ending in acute points: the flowers are axillary like the other sorts, at first pale yellow, but as they decay changing to an orange colour, smaller than those of the first sort: the seed-vessels slender, taper, hairy. It is also a biennial plant, and a native of Buenos Ayres. flowering from June to October.

The fourth species is a perennial, but altogether herbaceous, at least here, and therefore

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1 *Oenothera fruticosa* Shrubby oenothera

2 *Origanum dictamnus* Dittany of Crete

improperly named *fruticosa:* the flowers which are large and showy, though they open in the evening, remain expanded during most of the ensuing day: the flower-buds, germ, and stalk, are enlivened by a richness of colour which contributes to render this species one of the most ornamental and desirable. It is a native of Virginia.

The fifth has also a perennial fibrous root: the lower leaves ovate, small, close to the ground: the stalk slender, near a foot high: the leaves smaller, light green, sessile, ending in blunt points: the flowers small, bright yellow: it sends up many flowering-stems, producing blossoms from April to July, opening in the morning as well as evening. It is a native of North America.

Culture.—These plants are all capable of being raised from seeds, and some of them by parting the roots and cuttings.

The seed should be sown either in the autumn or early spring, in the first and third sorts, upon a bed or border in the open ground, thinning and watering the plants properly, and keeping them free from weeds till the following autumn, when they may be removed with balls of earth about their roots to the places where they are to remain. Or some may be set out at the time of thinning in nursery-rows, six inches apart.

They also rise without trouble from the scattering of the seeds.

In the second sort, the seed should be put into the ground in the open borders or other parts, about the latter end of March, where the plants are to remain. One plant is sufficient in a place, which should have a stick set to support its branches when they have advanced a little.

The fourth sort may be readily increased by sowing the seeds as above, and by parting the roots and cuttings of the young branches, planting them out in the open borders or other places where they are to grow in the autumn, for the first method, and the spring for the latter, giving water as there may be occasion.

In the fifth sort, the seeds should be sown in pots of light earth in the autumn, plunging them in a hot-bed frame during the winter. When the plants have attained proper growth in the spring, they should be removed into separate pots, which should be protected in the following winter under a garden frame. And some may be planted out in the open ground, where they often succeed in mild winters.

The parted roots should be planted out in the spring, either in pots or the open ground.

The plants raised from seed are in general the best, as flowering more strongly.

By cutting down the stems of the plants in the first year of their flowering before they perfect their seeds, the plants may sometimes be rendered more durable.

The first two sorts, as has been seen, are biennial, and the others perennial; the former should of course be raised annually.

They are all proper for affording ornament and variety, either in the open ground or among other potted plants. The second and third sorts are often considered as greeen-house plants, but they succeed well in the open ground.

OFF-SET, a sort of sucker or small young plant, issuing from the sides of the main root of different sorts of perennial plants, whether bulbous-, tuberous-, or fibrous-rooted, by means of which they are often readily increased.

The method of increasing by Off-sets is applicable in general for all sorts of bulbous- and tuberous-rooted perennial plants, such as tulips, anemones, &c. in which there are small bulbs, or tubers, that on being planted out afford plants of exactly the same kind as those from which they are taken, and which, after having one or two years' growth, flower, produce seed, and furnish a supply of Off-sets in their turn.

In the vast tribe of fibrous-rooted perennial plants, most sorts afford a progeny of this sort, for propagating and perpetuating their respective species and varieties, both in the flowery kind, &c., and in some esculents, but more considerably in the former; by which numerous sorts of the most beautiful flowering perennials are multiplied.

Off-sets are therefore not only an expeditious and certain method of propagation, but by which there is a certainty of having the desired sorts continued, whether species or particular varieties.

They have this advantage over seedlings, that the plants of the flowery kind often flower in one year; whereas seedling plants of the bulbous kinds are frequently four, five, and sometimes six or seven years before they flower in perfection. By seedlings new varieties are principally gained, the roots of which furnishing Off-sets by which they are increased.

The separating Off-sets may be performed in some sorts every year, in others once in two or three years, according to the sorts, and the increase of Off-sets afforded by the main roots.

The proper seasons for separating or taking them off, in the bulbous- and many tuberous-rooted plants, are chiefly summer and autumn, when they have done flowering, and the leaves are decayed, as at that period the roots of these sorts, having had their full growth, assume an

inactive state, drawing little nourishment from the earth for a few weeks. It is also the only proper period for moving all the bulbous kinds in particular, both to separate Off-sets and transplant the main roots, or to take them up for keeping for a while. See BULB.

The roots should be taken up in dry weather if possible, and all the Off-sets separated singly from the main bulb, &c. planting them in nursery-beds, in rows six inches asunder, by dibble, or in drills two or three inches deep, or in any other method that may be suitable. They should remain a year or two, according to their size, in this situation to get strength; then be transplanted, at the proper season, where they are to continue, managing them as other bulbous- and tuberous-rooted plants. See BULB and TUBER.

The Off-sets of fibrous-rooted perennial plants, may either be slipped off from the sides of the main roots as they stand in the ground, or the roots may be wholly taken up, and parted into as many slips as there are Off-sets properly furnished with fibres.

In this sort the proper season is autumn, when their stalks decay, or early in spring, before new ones begin to shoot forth; though some hardy sorts may be slipped any time in open weather from the autumn to the early spring, and others almost any time when they occur; planting them by dibble, the smaller ones in nursery-beds, in rows six or eight inches asunder, to have a year's growth; and the larger ones at once where they are to remain.

In several sorts of under-shrubby perennial plants that are capable of being increased by Off-sets from the bottoms, the proper season for taking them off is the autumn and spring, or in the hardy kinds any time in open weather, during the autumn or early spring, planting them in nursery-rows for a year or two, or till of proper size for the purposes they are designed for.

The Off-sets of succulent plants should generally be slipped off in summer, and, previous to planting those of the tender kinds, be laid on a dry shelf for some days, till the moisture at bottom is dried up; then planted in pots of dry soil, and managed according to their different kinds and habits of growth. See SUCCULENT PLANTS.

Off-sets are never produced from annual plants of any kind.

The particular management that is requisite in the different kinds is fully explained under the Culture of the plant to which it belongs.

OIL-TREE. See RICINUS.

OLD-MAN'S-BEARD. See CLEMATIS.

OLEA, a genus containing plants of the exotic tree kind. The *Olive Tree*.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Sepiariæ*.

The characters are: that the calyx is a one-leafed perianthium, tubular, small, deciduous: mouth four-toothed, erect: the corolla one-petalled, funnel-form: tube cylindrical, the length of the calyx: border four-parted, flat; segments subovate: the stamina have two, opposite, awl-shaped filaments, short: anthers erect: the pistillum is a roundish germ: style simple, very short; stigma bifid, thickish, with the clefts emarginate; the pericarpium is a subovate drupe, smooth, one-celled: the seed is a nut, ovate-oblong and wrinkled.

The species cultivated are: 1. *O. Europæa*, Common European Olive; 2. *O. Capensis*, Cape Olive; 3. *O. Americana*, American Olive; 4. *O. fragrans*, Sweet-scented Olive.

The first grows naturally in woods in the South of France, Spain, and Italy, and is therefore not cultivated: the leaves are much shorter and stiffer than those of the cultivated Olive: the branches are frequently armed with thorns, and the fruit is small and of little use.

There are several varieties; as the Warted Olive, which is a native of the Cape. The Long-leaved, which is chiefly cultivated in the South of France, and from which they make the best oil. The young fruit is the most esteemed when pickled.

There are several sub-varieties. The Broad-leaved, which is chiefly cultivated in Spain, where the trees grow to a much larger size than the preceding; the leaves are much larger, and not so white on their under side: the fruit is near twice the size of the Provence Olive, but of a strong rank flavour, and the oil is likewise strong.

There are also other varieties; as the narrow-leaved, short hard-leaved, shining-leaved, African, Lucca, &c.

It is observed that the Olive seldom becomes a large tree; but two or three stems frequently rise from the same root, from twenty to thirty feet high, putting out branches almost their whole length, covered with a gray bark: the leaves are stiff, about two inches and a half long, and half an inch broad in the middle, gradually diminishing to both ends, of a lively green on their upper side and hoary on their under, standing opposite: the flowers are produced in small axillary bunches; they are small, white, and have short tubes spreading open at top: the fruit is a su-

perior-berried drupe, of an oblong spheroidal form, and of a yellowish green colour, turning black when ripe

The usual method of making oil from Olives in Italy is, to crush the fruit to a paste with a perpendicular mill-stone running round a trough; which is then put into flat round baskets, made of rushes, piled one upon another under the press: after the first pressure, scalding water is poured into each basket, its contents stirred up, and the operation repeated till no more oil can be skimmed off the surface of the tubs beneath: but this is not a good method; the oil is seldom pure, keeps ill, and soon grows rancid: but by another process, which is that of pounding the fruit in a mortar, the crushed substance being then thrown into a long woollen bag, and rubbed hard upon a sloping board, and then wrung, adding afterwards hot water, and continuing to press as long as a drop of oil can be drawn, the work is much more effectually performed.

The unripe Olives when pickled, especially the Provence and Lucca sorts, are to many extremely grateful, and supposed to excite appetite and promote digestion. According to Miller they are prepared by repeatedly steeping them in water; to which some add alkaline salt or quick-lime, in order to shorten the process; after which they are washed, and preserved in a pickle of common salt and water, with sometimes the addition of an aromatic.

The best salad oil is of a bright pale amber colour, bland to the taste, and without the least smell.

It has been observed that, with a little protection in severe frost, the Olive-tree may be maintained against a wall about London, but that in Devonshire there are some of these trees which have grown in the open air many years, and are seldom injured by frost, yet the summers are not warm enough to bring the fruit to any great perfection.

The second species is a small tree, or rather shrub, not branching much: the trunk straight, with many joints; bark subhirsute, blackish brown, with ash-coloured dots and lines: the leaves conjugate, decussated, sometimes sinuated at the end, but commonly entire, dense, and rigid, moderately concave, paler or deeper green, but always paler underneath, with oblique smooth veins, less conspicuous underneath than above: from the axils and at the end of the branches the flowers come out in racemes in June and July, sometimes thinly disposed, but sometimes so numerous that the racemes hang down. It is a native of the Cape.

The third has the leaves opposite, evergreen, petioled, shining: the racemes short, axillary, brachiate, with opposite pedicels: the segments of the corolla revolute: the style so short as to be scarcely any: the stigma bifid: the drupe globular, even, handsome: the nut obovate, substriated, perforated at the base: and there are male and female flowers on the same plant with the hermaphrodites. It is a native of Carolina and Florida, flowering in June.

The fourth species is a large tree in its native situation, the branches and branchlets trichotomous, obscurely four-cornered, smooth: the leaves decussated, oblong, sharp, a little bent back at the edge, parallel-nerved, reticulated, smooth, deep green above, paler underneath, spreading, frequent on the branchlets, a finger's length: the petioles semicylindric, grooved, smooth, a quarter of an inch in length: the flowers on the branchlets, aggregate in umbels, about six or eight together; peduncles filiform, one-flowered, smooth, half an inch in length: the flowers are very sweet-scented. It is a native of China, &c., flowering in July and the following month.

Culture.—These plants may be propagated in this climate by layers, which should be made from the young branches in the spring, in the usual manner, and be occasionally watered during the summer season, when in the autumn following they may be taken off and be planted in separate pots, being duly watered and placed in proper shade till fresh rooted, removing them in the beginning of the autumn into the shelter of the green-house. The layers sometimes, however, require two summers before they become perfectly rooted.

It is notwithstanding the best method to purchase plants of this sort, which are annually sent to the Italian warehouse-men in London, of pretty large sizes, with orange and other trees, as they are very tedious in raising from layers.

These plants, after being thus procured, and cleaned from filth by soaking their roots in water, should be planted in pots filled with fresh sandy light earth, plunging them in a moderate hot-bed, shading them in the hot sun, and refreshing them occasionally with slight waterings as the earth in the pots becomes dry. When they begin to shoot they should have air admitted pretty freely in proportion to the weather, being afterwards inured to the open air in a place defended from winds, removing them in the beginning of autumn into the green-house.

When they have in this management acquired strong roots, they may be removed with earth about them, and be planted out in the open ground in a dry warm situation, being managed as myrtles and other similar plants. When

an inch in length, to cylindrical and an inch and half long, rough or villose, pointed, and furnished with a few fibres: the stem from six to nine inches high, the lower part smooth, the upper downy: the root-leaves four or more, forming a tuft, ovate-lanceolate, smooth, entire at the margins, bright green, half an inch in breadth, dotted when magnified, and faintly ribbed. By the side of these, and not from amongst them, arises the stem, clothed with three or four lanceolate, acuminate, embracing leaves, downy, and membranous at the edge: the spike from two to four inches long, twisted in a spiral form, with numerous (fifteen or more) flowers, growing from one side, and following its spiral direction. It is a native of many parts of Europe, flowering from August to October.

The third has the root composed of many strong fibres, from which arise two oval veined leaves, three inches long, and two broad, joined at their base; between these springs up a naked stalk about eight inches high, terminated by a loose spike of herbaceous flowers, resembling gnats, composed of five petals, with a long bifid lip to the nectarium, a crest or standard above, and two wings on the side. It is a native of many parts of Europe.

The fourth species has the bulbs roundish: the stem from nine to fifteen inches high: the leaves three or four, sheathing the stem at the base, lanceolate, pale green, smooth, shining, marked with numerous longitudinal nerves, the intermediate space covered with a thin somewhat pellucid puckered skin, giving them a silvery hue: the upper part of the stem naked, yellowish green, nearly round, smooth: the bractes linear-lanceolate, much longer than the germ, pale yellowish green: the flowers in a long thinly scattered spike; sometimes fifteen in number, but seldom more than four or five: it has much resemblance to a fly. It is a native of Sweden, &c. It flowers in May and June.

There are several varieties, as the fly-shaped; the great fly; the large green fly; the blue fly; and the yellow fly.

The fifth has the stem about a foot high, leafy, round except between the fructifications, where it is compressed: the leaves alternate, lanceolate, sheathing, pubescent, nerved: the bractes longer than the germs, lanceolate. The three outer petals large, spreading, purple, with the keel and two nerves green; the two inner petals very small, hairy, reflex, green: the lower lip of the nectary large, wide, but shorter than the petals, dusky purple mixed with yellow, three-lobed, the side-lobes smaller, hairy, reflex, triangular, acuminate; the middle one very large, pubescent, three-lobed, bent down, the middle segment longer, acuminate; upper lip narrowed above with a point, longer than the lower lip, of a green colour: the filaments long: anthers very large: the germ longer than the petals, but shorter than the bracte, large, deeply grooved. It is a native of Europe, flowering in June and July.

The sixth species has the stem six inches high, more or less according to its place of growth, round, smooth, covered below with leaves embracing it: the leaves next the root an inch and half long, almost an inch broad, ovate-lanceolate, somewhat blunt, marked with impressed lines, smooth, spreading on the ground; those of the stalk few, narrower and more pointed: the flowers from three to six, in a thin spike. It is a native of Britain, flowering in June.

It is fancied by some to resemble a bee, by others a spider; from the breadth of the lip, and its being marked with different shades of brown, it derives its resemblance to the latter. Others have dicovered a likeness to a small bird in the flower.

The seventh has a single bulb, round or somewhat oblong, with a few thick fibres from the crown: the stem about six inches high, round and smooth: the root-leaves two or three, sheathing the stem, lanceolate, acute, smooth, of a shining yellowish green, marked with parallel veins: on the stem one or two sessile awl-shaped leaves: spike an inch or an inch and half long, of numerous flowers, which are greenish yellow, with a faint musky smell. It is a native of many parts of Europe; Sweden, Denmark, &c., flowering in July.

The eighth species has a stem about a foot high, firm, smooth, round at the base, somewhat angular upwards: the root-leaves four or five, sheathing the stem at the base, lanceolate but varying in breadth, spreading: above these one or two more, closely embracing the stem: the flowers numerous, in a long loose spike. They vary in number from ten to fifty. The lip of the nectary is so divided as to bear a coarse resemblance to the human arms and legs, whence it has been named Man Orchis. It is a native of the southern parts of Europe, and England, flowering in June.

It varies in size, and in the colour of its flowers, from yellow green to bright ferruginous.

Culture.—All these plants may be introduced into the different parts of pleasure-grounds from the places where they grow naturally in this country, and be preserved; but they do not admit of being propagated in them; the proper period for this purpose is just before the stalks decay, in the latter end of summer or beginning of the autumn, as at that season the bulbs will be in the best state for growing strong and flowering the following

year. The roots should be taken up with large balls of earth round them, and be planted again as soon as possible. They should also be placed as as that the soils and situations may be as nearly as possible similar to those from which they were taken; those taken from woods being planted out in shady situations; those from boggy or marshy places, in the more moist and boggy parts; and those from dry elevated situations, in such as have the greatest degrees of dryness and are the most open. They should afterwards be as little disturbed as possible by any sort of culture;—with this sort of management the roots will often continue for several years, flowering annually during the summer.

In the culture of the sixth sort Mr. Curtis succeeded, by taking them up from their natural situations when in flower, and baring their roots no more than was necessary to remove the roots of other sorts of plants; then filling large-sized garden-pots with three parts good moderately stiff loam and one part chalk mixed well together, passing them through a sieve somewhat finer than a cinder sieve, afterwards planting the roots in them to the depth of two inches, and, where there is more than one, three inches apart, watering them occasionally during the summer season in dry weather, and on the approach of winter placing the pots under the protection of a frame and glasses in order to prevent their being injured by wet or frosts.

They all afford variety, and are highly ornamental in the clumps, borders, and other parts of shrubberies, &c.

ORCHARD, a portion of garden-ground set apart for the growth of different sorts of the more common sorts of fruit, but mostly that of the apple kind. The trees in this case are mostly of the standard kind, especially when large supplies of fruit are wanted, and generally consist of Apple-trees, Pear-trees, Plum-trees, and Cherry-trees; and, to render it more complete, should contain Quinces, Medlars, Mulberries, Service-trees, Filberts, Spanish Nuts, and Barberries, as well as Walnuts and Chestnuts. As the two last sorts are well adapted for sheltering the others from high winds, they should, Mr. Forsyth thinks, be planted in the boundaries of the orchard, a little closer than ordinary, for that purpose.

In providing trees, especially of the apple kind, for this purpose, too much care cannot be taken to admit of none but such as have good roots, fair clean stems, and proper heads; and at the same time attention should be paid that a proper assortment of the different sorts be procured for the supply of the table during the whole year, a few of the Summer sorts are sufficient, but more of the Autumn, and still a larger quantity of the Winter kind will be necessary; as upon this last sort the chief dependence must be placed from the beginning of the year till nearly the period of the fruit being ready again.

In districts where the process of cyder-making is conducted upon a large scale, large orchards of apples only are often met with; and in some counties, as Kent, there are orchards wholly of Cherries, or these and Filberts. In general, however, there ought to be a much larger proportion of Apples than of any other fruit in orchards, as in proper situations they are very profitable; and, in addition, the trees have a delightful appearance when in blossom, as well as when the fruit is ripe.

Situation and Soil.—In respect to situation, an orchard should rather be elevated than low, as on a gentle declivity; open to the south and south-east, to give free admission to the air and rays of the sun, as well as dry up the damps and disperse the fogs, in order to render the trees healthy, and give a fine flavour to the fruit. It should likewise be well sheltered from the east, north, and westerly winds, by suitable plantations, where not naturally sheltered by hills or rising grounds. Such plantations, when they consist of forest-trees, should neither be too large nor too near the orchard; as where that is the case they prevent a free circulation of air, which is injurious to the trees. Where the ground does not admit of such plantations, Mr. Forsyth advises planting cross rows of fruit-trees, in the manner directed in gardens, as well as some of the largest-growing trees nearest the outsides exposed to those winds, two or three rows of which should, he says, be planted closer than ordinary, which would greatly shelter those in the interior parts of the Orchard, and be of great service, in addition, to the walnut and chestnut trees, as mentioned above.

Orchards are planted on many different sorts of soil and succeed well; but a dry friable loam is probably the most suitable, as trees of this sort are impatient of moisture. Such as have been mentioned for gardens will answer perfectly well, and such as produce good crops of corn, grass, or other vegetables, are mostly proper for an Orchard; and though the above sort is to be preferred, any of a good quality, not too light or dry, nor wet, heavy, or stubborn, but of a moderately soft and pliant quality, will be found to answer the end perfectly. The shingly and gravelly soils disagree very much with fruit-trees, unless there be loam intermixed with them. They succeed much better on a chalk bottom, or subsoil. On such a soil, Mr. Forsyth has

seen roots twelve feet deep, and the trees thrive well. Where the bottom is clay, the roots should, he says, be cut-in once in four years, to prevent them from penetrating the clay, which would greatly injure the trees. Whatever the nature of the soil may be, it should have a good depth, as two or three feet. Where the soils are wet they should be well drained in the same manner as has been directed for gardens, or by forming the land in ridges with furrows between the rows to convey off the moisture, the turf being relaid in case of the ground being in the state of sward.

Size.—In regard to the size of an Orchard, it may vary from one to ten and fifteen or more acres, according to the quantity of fruit wanted, or the proportion of ground that is fit for the purpose.

Preparation.—This is effected in different ways: but the best method is, probably, before planting the trees, to trench it two spits deep, and ten feet broad, where the rows are to be planted, and to loosen a spit below, unless it be clay, which should, Mr. Forsyth says, be trodden down. Where the ground is in pasture, it should, he says, be ploughed, and well summer-fallowed, till the grass be killed, otherwise when it is laid in the bottom in trenching, which it generally is, it will be very apt to breed grubs, which do much mischief. In bad shingly or gravelly soils, he recommends that holes should be dug at least three feet deep, and filled up with good mould: if mixed up with rotten dung, rotten leaves, or other manure, the trees will in time amply repay the expense: the dung used for this purpose should, he says, be that from the melon and cucumber beds, mixed with the mould from the same, when the beds are broken up in autumn, or winter; and be laid up in heaps, and continued so for one year at least; but be frequently turned and have some good fresh mould mixed with it. It is the practice with some to only dig holes large enough to receive the roots, especially in grass-ground which is to be continued so. Others prepare the ground by deep ploughing, if the Orchard is to be of great extent. The sward, if pasture, should be ploughed-in some time in spring; a good summer-fallow should be given it, ploughing it two or three times, which will rot the turf. A fortnight or three weeks before planting, it should have a good deep ploughing to prepare it for the reception of the trees. In Kent, and some other hop districts, they prepare their orchard-ground by the growth of hops upon it with the fruit-trees, by which they are much protected and brought forward.

Season of Planting.—In relation to the period of planting, it may be performed with success at different seasons, according to the nature of the land. The best time for planting on a dry soil is, Mr. Forsyth says, in October; but, if wet, the latter end of February, or the month of March, will be a more fit season. The chief circumstance in this business is to suit the trees as much as possible to the soil, and to plant them at proper distances from each other; which may be from forty to eighty feet, according to the size of the trees when full grown. He observes that fruit-trees, when planted too thick, are very liable to blights, and to be covered with moss, which robs them of a great part of their nourishment, besides spoiling the flavour of the fruit.

Procuring the Trees.—In providing the trees it is a good practice to procure them from a soil nearly similar to, or rather worse than, that where they are intended to be planted; as trees transplanted from a rich soil to a poorer one never thrive so well; but if from a poor to a richer soil, they generally succeed in a perfect manner. Good trees, which have been properly pruned, which are quite free from bruises and disease, should always be carefully selected; and their roots be preserved as much as possible when taken up.

The most proper sorts of trees for small orchards may be those of the Janeting, Golden Pippin, Nonesuch, Ribston Pippin, Nonpareil, Queen, Sky-house, Golden Rennet, Aromatic Pippin, Grey Leadington, Scarlet Pearmain, Lemon Pippin, Pommegrise, French Crab, Russeting and Codling kinds. But various other sorts may be employed where the orchards are extensive, and a great variety of fruit necessary.

Planting the Trees.—With regard to the proper distance of planting the trees, it should be regulated by the natural growth or spreading of them when fully grown, as well as the nature and goodness of the soil. It was formerly the practice to have them put in at narrow distances; but at present ten, twelve, or fifteen yards are more common, and in the cyder districts from twenty to twenty five yards are in use. The usual mode of arranging the trees is, in open grounds in lines or rows; but in close plantations the quincunx method is more in use. In the row method, when it can be done, they should be in the direction of north and south, or one point more to the east, as by this means they will have the advantage of the sun from the early part of the morning in the spring season, which will in a great measure prevent the damp

fogs from hanging upon them and hindering the due increase of the fruit.

In the act of planting or putting them into the ground, great care should be taken that they are not put in to too great a depth, as where that is the case they are in great danger of being destroyed. It is also necessary that a bed of fine good mould be provided for them, and that it be carefully put in with them, so as to be properly insinuated among the fibres of the roots, and afford them due support; the whole being carefully trodden round the plants in finishing the business.

Upon this being performed in a proper and perfect manner, and the young trees afterwards kept perfectly steady by suitable supports, the success of the planter in a great measure depends.

Where the trees are planted in the quincunx order, and at the distance of eighty feet, Mr. Forsyth says, "the ground between the rows may be ploughed and sown with wheat, turnips, &c. or planted with potatoes: the ploughing or digging the ground, provided it be not done so deep as to hurt the roots, by admitting the sun and rain to meliorate the ground, will, he thinks, keep the trees in a healthy flourishing state. It will be necessary to support the young trees by tying them to stakes until they are well rooted, to prevent their being loosened or blown down by the wind.

"In the spring after planting, if it prove dry, some turf should be dug and laid round the stems of the young trees with the grassy side downwards; which will keep the ground moist, and save a deal of watering: if the trees have taken well, this need not be repeated, as they will be out of danger the first year. The turf should be laid as far as the roots of the trees are supposed to extend; and when it is rotted it should be dug-in, which will be of great service to their roots.

"Such trees as are of very different sizes when full grown should not, he says, be planted promiscuously; but, if the soil be properly adapted, the larger planted in the back parts or higher grounds, or at the north ends of the rows, if they run nearly north and south, and the others in succession according to their size. The trees when planted in this manner will have a fine effect when grown up; but if they are planted promiscuously, they will not appear so agreeable to the eye; and, besides, the smaller trees will be shaded by the larger, which injures them, and spoils the flavour of the fruit.

"It is advised that Orchards should be dunged once in two or three years with some sort of good manure, as this is of much advantage in rendering them fruitful and productive.

"The stems of trees in those where cattle feed should be high enough to prevent their eating the lower branches; and fenced in such a manner as to prevent their being barked, or injured by the cattle rubbing against them, particularly when young; which may be done by triangles of wood, or the trees may be bushed with thorns.

But in orchards where cattle are not permitted to go, Mr. Forsyth prefers "dwarf-trees to standards, taking care to proportion the distance of the rows to the size of the trees."

After-Management.—This chiefly consists in keeping the trees properly pruned and cut-in; as where this is judiciously done the trees will come into bearing sooner, and continue in vigour for nearly double the common time. But with these standard-trees less culture is necessary than in other cases. No branch should ever be shortened, unless for the figure of the tree, and then it should be taken off close at the separation. The more the range of branches shoot circularly, a little inclining upwards, the more equally will the sap be distributed, and the better the tree bear. The ranges of branches should not be too near each other, that the fruit and leaves may not be deprived of their full share of sun; and where it suits, the middle of the tree should be so free from wood, that no branch may cross another, but all the extremities point outwards.

About October or November, or as soon as the fruit is removed, is the most proper season for this work. It is the best practice to take off superfluous branches with a saw, and afterwards to smooth the place with a knife; for it is essential that every branch which is to come off should be cut perfectly close and smooth. The wounded part may then be smeared over with a proper composition. Such branches should always be taken off as come near to the ground, that have received any material injury, where the leaves are much curled, or that have a tendency to cross the tree or run inwards. And a little attention may be given to the beauty of the head, leaving all the branches as nearly equidistant as possible. Where there are any remaining blotches, they should be opened or scored with a knife; and where the bark is ragged from any laceration, it should be pared gently down to the live wood: touching over each with a proper composition. This being done, the moss should be rubbed clean off, and the trees scored. In this last operation, care should be taken not to cut through the inner or white rind, which joins the bark to the wood. When trees are much thinned, they are subject to throw out great quantity of young shoots in the spring, which

There are varieties with white flowers and light-green stalks; with purple flowers and with variegated leaves; which is sometimes cultivated in gardens, under the title of *Pot Marjoram*, used in soups.

The second species has the habit of Sweet Marjoram, but it is woody: the stems woody, perennial, a foot and half high, branched, spreading with long hairs: the leaves small, subsessile, acute, thinly serrate, tomentose on both sides; with rudiments of branches from the axils: the spikes heaped, as in the third sort, but oblong, by threes on each peduncle, the middle ones sessile, villose: the flowers are white, appearing in July. It is a native of Sicily.

The third has a biennial, brown root, with many long tough fibres: the stems numerous, woody, branched, a foot and half high: the leaves are downy, entire, pale green, petioled: the flowers small, white, appearing successively between the bracteal leaves, which are numerous, and form roundish compact terminating spikes. It begins to flower in July, when it is cut for use, and called *Knotted Marjoram*, from the flowers being collected into roundish knotted close heads. It is probably a native of China.

The fourth species has a perennial root, from which arise many branching stalks a foot and half high, hairy, and inclining to a purplish colour: the leaves ovate, obtuse, hairy, greatly resembling those of Sweet Marjoram, on short foot-stalks: the flowers in spikes about two inches long, several arising together from the divisions of the stalk: the flowers are small, white, peeping out of their scaly covers. It grows naturally in Greece, &c.

It is at present commonly known by the name of *Winter Sweet Marjoram*, but was formerly called *Pot Marjoram*, being chiefly used for nosegays, as coming sooner to flower than Sweet Marjoram.

There is a variety with variegated leaves.

The fifth is a perennial plant with a low shrubby stalk, seldom rising more than a foot and half high, dividing into branches: the leaves roundish, thick, woolly, hollowed like a ladle; they are like those of common Marjoram, but of a thicker substance, and have much the same scent: the flowers are produced in roundish spikes, closely joined together at the top of the stalks, and at the end of the small side branches; they are of a pale flesh colour, peeping out of their scaly coverings. It is a native of Egypt, flowering from June to August.

The sixth species is also a perennial plant: the stalks hairy, about nine inches high, of a purplish colour, sending out small branches from the sides by pairs: the leaves round, thick, woolly, very white; the whole plant has a piercing aromatic scent, and biting taste: the flowers are collected in loose leafy heads of a purple colour, nodding, and small. It is a native of the island of Candia, flowering from June to August.

Culture.—The four first sorts may be readily increased by slips, cuttings, and parting the roots, and in the first and third sorts also by seeds.

The seed should be procured fresh from the seed-shops, and be sown in the early spring months, as March or the following month, on a bed or border of good light mould, raking it in lightly. When the plants are up and have attained a few inches in growth, they should be planted out during moist weather, in a warm dry situation, in rows ten or twelve inches distant, to remain, water being given occasionally till they become perfectly rooted. When the plants are designed for the borders or clumps, the seeds may be sown in patches where the plants are to remain.

The roots of the strongest plants may be parted so as to have some root-fibres to each in the early autumn or spring season, and be planted out in rows in the same manner as those raised from seed; having the same management afterwards till fresh rooted. The slips or cuttings of the branches should be taken off in the summer, and immediately planted out where the plants are to remain.

All the sorts should be afterwards kept perfectly clean from weeds during the summer season, and in the autumn have the decayed stalks cleared away, loosening the mould about the plants; and when in beds, digging the alleys and throwing a little of the earth over the beds.

When necessary the plants may be removed into the pleasure ground, with small balls of earth about their roots, either in the autumn or early spring.

The other tender kinds may be increased by planting slips or cuttings of the young shoots, in the spring and summer months; in the former season in pots of light earth, plunging them in a mild hot-bed, but in the latter either in pots or warm shady borders; water being immediately given and occasionally repeated in small proportions, being covered down by hand glasses in the latter case, to expedite their rooting; being removed, when the plants begin to shoot at the top. In the autumn the plants may be removed into separate small pots, and afterwards treated as the more hardy plants of the green-house kind.

The three first sorts are useful as culinary plants, as well as ornamental in the borders of the pleasure ground: and the other kinds afford variety in the green-house collections.

ORNITHOGALUM, a genus containing plants of the bulbous-rooted, flowery, herbaceous, perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Coronariæ*.

The characters are: that there is no calyx: the corolla has six petals, lanceolate, upright below the middle, above it spreading, permanent, losing their colour: the stamina have six upright filaments, alternately widening at the base, shorter than the corolla: anthers simple: the pistillum is an angular germ: style awl-shaped, permanent: stigma blunt: the pericarpium is a roundish capsule, angular, three-celled, three-valved: the seeds many and roundish.

The species cultivated are: 1. *O. umbellatum*, Umbelled Star of Bethlehem; 2. *O. luteum*, Yellow Star of Bethlehem; 3. *O. minimum*, Small Star of Bethlehem; 4. *O. Pyrenaicum*, Pyrenean Star of Bethlehem; 5. *O. latifolium*, Broad-leaved Star of Bethlehem; 6. *O. pyramidale*, Pyramidal Star of Bethlehem; 7. *O. unifolium*, One-leafed Star of Bethlehem; 8. *O. nutans*, Neapolitan Star of Bethlehem; 9. *O. Capense*, Cape Ornithogalum; 10. *O. aureum*, Golden Star of Bethlehem.

The first has a solid bulb, having smaller bulbs joining to it: the root-leaves (sometimes five) soft, keeled, or convex on the outside and channelled within, with a white silvery streak, from one to two lines in width, and above a foot in length, linear, bright green: the scape upright, round, very smooth, a long span or a foot in height, terminating at top in alternate peduncles, very long and broad; all together forming a sort of corymb, resembling an irregular umbel, but not springing from the same point, the lower ones being longer: the flowers are all nearly of the same height; they are one-flowered, and each has a white, membranaceous, lanceolate, very large bracte. Woodward remarks that it is improperly called *umbellatum*, as the flowers are in a most evident spike (or rather corymb). It is a native of the southern parts of Europe, &c., flowering in April and May.

The second species has the root-leaves generally single, and longer than the stem, which is from four to six inches high: the stem-leaves two, three, or four, one very large, the other smaller, all unequal; fringed with fine white hairs: from these arise a few fruit-stalks, (three to seven) each supporting one flower, and forming an umbel. It is a native of most parts of Europe, flowering in April.

Its roots have been used for food in times of scarcity, in Sweden.

In the third, according to Miller, the bulbs are not larger than peas. There is one or two narrow keel-shaped leaves about five inches long, of a grayish colour, arising from them. The stalk is angular, about four inches high, having two narrow keel-shaped leaves just below the flowers, which are disposed in an umbel on branching peduncles, yellow within but of a purplish green on the outside; they appear in May, and are succeeded by small triangular capsules filled with reddish uneven seeds. It is a native of Sweden &c.

The fourth species has a naked stem, a foot and half or two feet high: the flowers are in a long spike on slender peduncles, each arising from a membranaceous half-embracing bracte, broad at the base, tapering to a point: the bulb pretty large, with several long keeled leaves coming out from it and spreading on the ground; among these comes out a single naked stalk about two feet long, sustaining a long loose spike of flowers of a yellowish green colour, on pretty long peduncles, and spreading wide from the principal stalk. The flowers have an agreeable scent, and appear in May. It is a native of some parts of Europe.

The fifth has a large bulb; the root-leaves are several, broad, sword-shaped, spreading on the ground: the stalk thick, strong, between two and three feet high, bearing a long spike of large white flowers, upon long pedicels: the leaves are a foot long, and more than two inches in breadth. It has been obverved by Clusias, with above one hundred flowers on a spike. It is a native of Egypt and Arabia, flowering in June.

The sixth species has a very large oval bulb, from which arise several long keeled leaves, of a dark green colour; in the middle of these springs up a naked stalk, near three feet high, terminated by a long conical spike of white flowers, on pretty long pedicels. It grows naturally in Spain and Portugal, flowering in June.

The seventh has an ovate bulb, the size of a hazel nut: the leaf is upright, flat, broad-lanceolate, blunt, naked, ciliate, sheathing the scape at the base: the scape upright, round, longer than the leaf, terminated by a few-flowered raceme; the flowers peduncled, alternate. It is a native of the Cape of Good Hope.

The eighth species has a pretty large, com-

pressed bulbous root, from which come out many long, narrow, keeled leaves of a dark green colour. the stalks are very thick and succulent, about a foot high, sustaining ten or twelve flowers in a loose spike, each hanging on a footstalk an inch long. It is a native of Italy, flowering in April and May.

The ninth has an irregular tuberous root, varying greatly in form and size, covered with a dark brown skin, from which spring several leaves, upon pretty long footstalks, having several longitudinal veins: the flower-stalks are slender, naked, and about a foot high, sustaining several small greenish-white flowers, formed in a loose spike, standing upon long slender pedicels: they come out in November. It is a native of the Cape of Good Hope.

The tenth has a whitish bulb, from which spring three or four smooth, somewhat fleshy, upright, dark green leaves, about half an inch wide, and three or four inches long, edged with white, and, if magnified, appearing fringed with very fine villose hairs: the stalk is naked, from eight to twelve inches high, supporting many flowers, which spring from the axils of large, hollow, pointed bractes, and, opening one after another, keep the plant a considerable time in flower; they are usually of a bright orange or gold colour, but sometimes paler. It is a native of the Cape of Good Hope, flowering in January and February.

Culture.—All the sorts are capable of being increased by planting the strong off-sets from the old roots in the latter end of the summer season, when their leaves and stems begin to decay, either in beds or the borders; the old roots may either be immediately replanted or kept out of the ground some time, but they flower much stronger when put into the ground in autumn, than if kept out till the spring. The small off-set bulbs should be planted out in nursery rows in beds for some time, till sufficiently large to be finally set out where they are to grow. They should have a light sandy soil, little manured.

They afterwards require the same mangement as other hardy bulbs. See BULB; but they should be removed every other year, as when let remain longer they become weak.

The two last sorts should have the off-sets or slips planted in separate pots, at the same time with the above, filled with good light earth, placing them under a hot-bed frame, so as to be protected from wet during the winter season, giving them full air in the summer. The old roots may be taken up in the autumn as in the other sorts, and after being kept a little while out of the ground, be replanted in the beginning of the autumn.

The hardy sorts are all highly ornamental among other flowering bulbous-rooted plants, in the borders, clumps, &c.

And the two last kinds afford variety in the collections of potted plants of the flowering bulbous-rooted sorts.

OROBUS, a genus containing plants of the hardy herbaceous fibrous-rooted perennial flowery kind.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leafed perianthium, tubular, blunt at the base: mouth oblique, five-toothed, very short; the three lower toothlets sharper; the two upper shorter, more deeply and bluntly divided: shrivelling: the corolla is papilionaceous: banner obcordate, reflex at the tip and sides, longer: wings two, oblong, almost the length of the banner, rising, with the edges converging: keel manifestly bifid below, acuminate, rising; with the edges converging, parallel, compressed; the bottom ventricose: the stamina have diadelphous filaments, (simple and nine-cleft), ascending: anthers roundish: the pistillum is a cylindrical germ, compressed: style filiform, bent upwards, erect: stigma linear, pubescent on the inner side from the middle to the top: the pericarpium is a round legume, long, acuminate, and ascending at the end, one-celled, two-valved: the seeds very many and roundish.

The species cultivated are: 1. *O. lathyroides*, Upright Bitter-Vetch; 2. *O. luteus*, Yellow Bitter-Vetch; 3. *O. vernus*, Spring Bitter-Vetch; 4. *O. tuberosus*, Tuberous Bitter-Vetch; 5. *O. niger*, Black Bitter-Vetch; 6. *O. Pyrenaicus*, Pyrenean Bitter-Vetch.

The first has a perennial root: the stalks three or four, branching, about a foot high: the leaflets smooth, stiff, of a lucid green: the flowers in close spikes on short peduncles, from the axils of the leaves at the top of the stalks, where are generally three or four of these spikes standing together: the corolla is of a fine blue colour: the flowers appear in June. It is a native of Siberia.

The second species has a very thick root, often transverse, hard, with the fibres widely diffused: the stem is a foot high and more, straight, angular, striated, smooth: the leaflets four or five pairs, entire, veined on both sides, netted, smooth, whitish underneath, terminated by a bristle; sometimes there is an odd leaflet: the stipules semisagittate, entire, or obscurely serrate with distant teeth, of the same colour with the leaves: peduncles angular, striated, smooth, naked, twice as long as the leaves: the flowers in loose spikes,

all directed the same way, twelve or more, of a yellow colour. It is a native of Siberia.

The third has a perennial root, creeping, not tuberous, woody, black, with many strong fibres: the stem about a foot high, upright, unbranched, smooth, angular, twisted or elbowed at each insertion of the leaves: the leaves alternate, petioled, leaflets two or three pairs, without an odd one, large, ovate-lanceolate, sessile, quite entire, nerved, bright green, smooth, tender: the stipules at the base of the petioles large, wide: the flowers are blue. It is a native of many parts of Europe, flowering in March or April.

There are varieties with purple flowers, with pale blue flowers, with deep blue flowers.

The fourth species has a perennial root, consisting of tough fibres, swelling here and there into irregular tubercles, each of which produces a stalk about a foot high, simple, upright, having two or three leafy or winged angles: the leaves are alternate, three or four in number; each consisting of two or three pairs of smooth sessile leaflets without an odd one, the petiole terminated by a kind of awn, as are the leaflets, being a production of the midrib; leaflets all elliptical, blueish underneath, the lower ones broader, the upper approaching to linear, all having three nerves or longitudinal veins: the stipules in pairs at the base of each leaf, frequently entire, but more often jagged at bottom, with one or several teeth: the flowers from two to four or five in a thin spike on naked slender axillary peduncles, of a reddish purple. It is a native of most parts of Europe, flowering in May and June, and sometimes in April.

It is sometimes called *Wood-Pea* and *Heath-Pea*.

The fifth has a perennial root, strong, woody: the stems many, branching, two feet high, having one pinnate leaf at each joint, composed of five or six small, oblong, oval leaflets: the flowers are on very long axillary peduncles, having four, five, or six purple flowers at the top. It is a native of most parts of Europe, flowering from May to July.

The sixth species has the stem angular, with the angles slightly winged, branched, somewhat villose: the leaflets on short petioles; the nerves underneath villose: the stipules oblong, one-tailed: the racemes striated: the flowers directed one way, pendulous: standard obcordate, red, with lines of a deeper colour. It is a native of the South of Europe.

Culture.—All the sorts are capable of being increased by seeds and parting the roots. The seed should be sown in the beginning of the autumn, as in September or October, in the clumps, borders, or other parts where they are to remain, or on a bed of good earth, to be afterwards pricked out and transplanted. The plants should be kept perfectly free from weeds.

The roots of the large plants may be parted in the autumn, and immediately planted out where the plants are to grow. The small roots may be set in nursery rows, to remain till sufficiently strong for being finally planted out.

They are all hardy flowering ornamental plants for the borders, clumps, and other parts of pleasure-grounds.

ORYZA, a genus containing plants of the exotic annual kind.

It belongs to the class and order *Hexandria Digynia*, and ranks in the natural order of *Gramina* or *Grasses*.

The characters are: that the calyx is a one-flowered glume, two-valved, very small, acuminate, almost equal: the corolla two-valved: valves boat-shaped, concave, compressed, the larger five-angled, awned: nectary (petals of Micheli) two-leaved, flat, on one side of the germ, very small: leaflets narrow at the base, truncate at the tip, caducous: the stamina have six capillary filaments, the length of the corolla: anthers bifid at the base: the pistillum is a turbinate germ: styles two, capillary, reflex: stigmas club-shaped, feathered: there is no pericarpium: corolla growing to the seed, oval-oblong, compressed, margins thin, two streaks on each side at the side: the seed single, large, oblong, blunt, compressed, with two streaks on each side.

The species is *O. sativa*, Rice.

It has the culm from one to six feet in length, annual, erect, simple, round, jointed: leaves subulate-linear, reflex, embracing, not fleshy: the flowers in a terminating panicle: the calycine leaflets lanceolate: the valves of the corolla equal in length; the inner valve even, awnless; the outer twice as wide, four-grooved, hispid, awned: the style single, two-parted. It is a native of India.

There are several varieties.

The *Common Rice* has the culm four feet high: the panicle spiked, the spikes commonly simple: the fruit oblong, pale, with long awns. It is late, and is cut from six to eight months after planting.

The *Early Rice* has the culm three feet high: the panicle spiked; spikes branching: the fruit turgid, brownish red, with shorter awns. It ripens and is cut in the fourth month from planting.

The *Dry* or *Mountain Rice* has the culm three feet high, and more slender: the fruit longish, with awns the longest of all. It is sown on mountains, and in dry soils.

The *Clammy Rice* has the culm four feet high:

the leaves wider, yellowish: panicle large, with shorter awns: the seed oblong, largish, glutinous, usually very white. This is cultivated both in wet and dry places.

It varies with a black seed, which is higher flavoured, and also with a red seed.

There are other varieties.

Culture.—These plants may be increased by seeds in the early spring.

The seeds should be sown on a hot-bed, and when the plants are come up, be transplanted into pots filled with rich light earth, and placed in pans of water, which should be plunged into a hot-bed; and as the water wastes, it must be renewed from time to time. They must be kept in the stove all the summer, and towards the end of August they will produce the grain, which will ripen tolerably well, provided the autumn prove favourable for the plants.

They afford variety in the hot-house collections.

OSIER. See SALIX.

OSTEOSPERMUM, a genus comprising plants of the shrubby exotic kind for the greenhouse.

It belongs to the class and order *Syngenesia Polygamia Necessaria*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common, simple, hemispherical, many leaflets awl-shaped, small: the corolla is compound, rayed: the corollets hermaphrodite very many, in the disk: females about ten in the ray: proper of the hermaphrodite tubular, five-toothed, the length of the calyx: of the female ligulate, linear, three-toothed, very long: the stamina in the hermaphrodites have five capillary filaments, very short: anther cylindrical, tubulous: the pistillum in the hermaphrodites has the germ very small: style filiform, scarcely the length of the stamens: stigma obsolete:—in the females, germ globular: style filiform, the length of the stamens: stigma emarginate: there is no pericarpium: calyx unchanged: the seeds in the hermaphrodites none:—in the females solitary, subglobular, coloured, at length hardened, inclosing a kernel of the same shape: pappus none: the receptacle is naked and flat.

The species cultivated are: 1. *O. spinosum*, Prickly Osteospermum; 2. *O. pisiferum*, Smooth Osteospermum; 3. *O. moniliferum*, Poplar-Leaved Osteospermum; 4. *O. polygaloides*; 5. *O. cæruleum*, Blue-flowered Osteospermum.

The first is a low shrubby plant, which seldom rises above three feet high, and divides into many branches: the ends of the shoots are beset with green branching spines: the leaves are very clammy, especially in warm weather; they are long and narrow, and set on without any order: the flowers are produced singly at the ends of the shoots; they are all yellow, and appear in July and August. It is a native of the Cape of Good Hope, flowering from February to October.

The second species has the angles of the branches toothleted by the back of the petioles running down, and are frequently wholly involved in wool, which disappears with age: the leaves are wedge-form, erose: the peduncles scaly: the flowers small: the seeds obovate: the stem four or five feet high, dividing into many branches towards the top, which spread out flat on every side; they have a purplish bark. It produces tufts of yellow flowers at the extremity of the shoots, from spring to autumn.

The third rises with a shrubby stalk seven or eight feet high, covered with a smooth gray bark, and dividing into several branches: the leaves alternate, of a thick consistence, covered with a hoary down, which goes off from the older leaves, unequally indented on their edges: the flowers are in clusters at the ends of the branches, six or eight coming out together on petioles an inch and half long, of a yellow colour.

It seldom flowers in this climate; but the time of its flowering is July or August.

The fourth species has three small branches: the leaves small, oblong, sessile, on some of the upper branches imbricate: the flowers come out at the end of the branches, standing singly on peduncles about an inch long.

The fifth is an undershrub, three feet high, with a strong smell: the root woody, branching, fibrous: the stem somewhat woody, erect, round, regularly branched, gray: the leaves alternate, spreading: segments alternate, (some almost opposite,) oblong, acute, serrate; the lower sinuses wider, deeper, parallel to the midrib; the upper ones rounded; they are without veins, and have only one nerve prominent beneath; are of the same colour on both sides, and fragrant, from an inch and a half to two inches in length, and fifteen lines in breadth: the flowers terminating, very loosely corymbed, peduncled, erect, blue, an inch wide. It is a native of the Cape.

Culture.—These plants may be increased by cuttings of the young shoots, which may be planted in any of the summer months, upon a bed of light earth, being watered and shaded until they have taken root, when they must be taken up and planted out separately in pots; as when they are suffered to stand long, they are apt to make strong vigorous shoots, and be difficult to transplant afterward, especially the second and third sorts; but there is not so much danger of the first, which is not so vigorous, nor so easy in taking root as the other. In the summer season

the pots should be frequently removed, to prevent the plants from rooting through the holes in the bottoms of the pots into the ground, which they are very apt to do when they continue long undisturbed, and when they shoot very luxuriantly; and on their being removed, these shoots, and sometimes the whole plants, are destroyed.

As the plants are too tender to live in the open air in this climate, they should be placed in the green-house in October, and be treated in the same manner as Myrtles, and other hardy green-house plants, which require a large share of air in mild weather; and in the beginning of May the plants removed into the open air, and placed in a sheltered situation during the summer season. As the first and second sorts are very thirsty plants, they should have plenty of water.

These plants afford variety among others of the green-house kind.

OSWEGO TEA. See MONARDA.

OSYRIS, a genus containing a plant of the shrubby kind.

It belongs to the class and order *Dioecia Triandria*, and ranks in the natural order of *Calycifloræ*.

The characters are: that in the male, the calyx is a one-leafed perianthium, trifid, turbinate: segments equal, ovate, acute: there is no corolla, except a triple nectariferous rim: the stamina have three filaments, very short: anthers roundish, small: in the female, the calyx is a perianthium as in the male, superior, permanent, very small: there is no corolla, as in the male: the pistillum is a turbinate germ, inferior: style the length of the stamens: stigma three-parted, spreading, (roundish): the pericarpium is a globular berry, one-celled, umbilicated: the seeds bony, globular, filling the pericarpium.

The species cultivated is O. *alba*, Poet's Casia.

It is a very low shrub, seldom rising above two feet high, having woody branches: the leaves long, narrow, of a bright colour: the flowers of a yellowish colour; succeeded by berries, which at first are green, and afterwards turn to a bright red colour, like those of the Asparagus. It is a native of France, &c.

Culture.—These plants are increased, by sowing the berries in autumn as soon as ripe, in some gravelly, stony, or similar situation, on the side of a rising ground, either in the places where the plants are to remain, which is the most successful, or in a nursery-bed for transplanting. As the seeds often remain two years before they vegetate, the places should be kept clear from weeds during that time, or till the plants appear. They afterwards require only to be freed from weeds.

They afford variety in beds, borders, or other places, by the beauty of their fruit.

OTHONNA, a genus containing plants of the shrubby exotic evergreen kind.

It belongs to the class and order *Syngenesia Polygamia Necessaria*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common, quite simple, one-leafed, blunt at the base, sharp at the end, equal, divided into eight or twelve segments: the corolla compound, rayed: corollets hermaphrodite many, in the disk: females in the ray, the same number with the segments of the calyx, often eight (about ten,): proper of the hermaphrodite, tubular, five-toothed, scarcely longer than the calyx: of the female, ligulate, lanceolate, longer than the calyx, three-toothed, reflex: the stamina in the hermaphrodites, filaments five, capillary very short: anther cylindric, tubular, the length of the corollet: the pistillum in the hermaphrodites, germ oblong: style filiform, commonly longer than the stamens: stigma bifid, simple: in the females, germ oblong: style filiform, the same length as in the others: stigma reflex, larger: there is no pericarpium: calyx unchanged, permanent: the seeds in the hermaphrodites none: in the females solitary, oblong, naked or downy: the receptacle is naked, dotted: (somewhat villose in the middle, excavated about the edge.)

The species cultivated are: 1. O. *bulbosa*, Bulbous African Ragwort; 2. O. *pectinata*, Wormwood-leaved African Ragwort; 3. O. *abrotanifolia*, Southernwood-leaved African Ragwort; 4. O. *coronopifolia*, Buckshorn-leaved African Ragwort; 5. O. *cheirifolia*, Stock-leaved African Ragwort; 6. O. *arborescens*, Tree African Ragwort.

The first has a thick shrubby stalk, dividing into several branches, which rise five or six feet high; the leaves come out in clusters from one point, spread on every side; they are smooth, narrow at their base, enlarging gradually to their points, which are rounded; their edges are acutely indented like those of the Holly: from the centre of the leaves arise the foot-stalks of the flowers, which are five or six inches long, branching out into several smaller, each sustaining one yellow radiated flower, shaped like the former; these are succeeded by slender seeds crowned with down. It flowers in May and June.

It is herbaceous, and varies with ovate, quite entire leaves; with the root-leaves pinnate, quite entire; with the leaves linear, very narrow; with the leaves lanceolate, quite entire; with the leaves lanceolate, toothed; with the leaves lanceolate-sub-elliptic; with the leaves

sublanceolate, three-toothed, or shrubby; with the leaves of the top lanceolate, subsessile; and with the leaves alternate, lanceolate, toothed. It is an extremely variable plant.

The second species rises with a shrubby stalk about the thickness of a man's thumb, two or three feet high, dividing into many branches, covered with a hoary down: the leaves hoary, about three inches long and one broad, cut into many narrow segments almost to the midrib; these segments are equal and parallel, and have two or three teeth at the end: the flowers are produced on long axillary peduncles towards the ends of the branches; they have large yellow rays; and are succeeded by oblong purple seeds crowned with down. It flowers in May and June.

The third has a low, shrubby, branching stalk: the leaves are thick, like those of Sampire, and are cut into many narrow segments: the flowers are produced on short peduncles at the ends of the branches, are yellow, and the seeds brown. It flowers from January to March.

The fourth species rises with a shrubby stalk four or five feet high, dividing into several branches: the leaves grayish, placed without order; those on the lower part narrow and entire, but the others indented on the edges: the flowers are produced in loose umbels at the ends of the branches, and are yellow. It flowers from July to September.

The fifth has a strong fibrous root, which shoots deep in the ground, and sends out many woody stems, which spread on every side, and trail upon the ground: the leaves grayish, sessile, and of a thick consistence, narrow at the base, enlarging upwards, and broad at their points, where they are rounded: the flowers are produced upon long, thick, succulent, peduncles at the ends of the branches, and from the axils; they are yellow, the rays sharp jointed, and not much longer than the calyx, which is cut into eight equal segments at top; the disk is large, and the florets as long as the calyx. It is a native of Africa.

The sixth species has the height (at five years of age) of one foot, with a stem the thickness of a human finger, resembling *Sedum arborescens*, and like that fleshy and woody, though never so tall or thick, pliant, covered with a brownish ash-coloured bark, not rough but rather smooth, and having woolly tubercles scattered over it: the branches also have them, and are obliquely curved inwards: the ends of the branches and base of the leaves have a fine wool on them, not conglobated but scattered: the branches are otherwise naked, somewhat woody, covered with a bark like that of the stem, brownish green towards the end, more tender and herbaceous; these leaves come out alternately at short distances; they are oblong, wider towards the top, and blunt; contracted towards the base, green on both sides, somewhat glittering, and as it were mealy, like those of Auricula, flat, thickish, succulent and smooth, veinless, with only a white nerve protuberant underneath, and on the upper part a little hollowed next the base. It is a plant that makes very slow progress in this climate. In August it puts out young leaves, which it keeps all the winter; the heads of flowers appear about the end of November, and do not open till the middle or end of January: in spring the leaves gradually drop off, and the plant appears as if dead till the succeeding autumn.

All the species, except the fifth, are natives of the Cape.

Culture.—These plants may be increased, by planting slips and cuttings of the young shoots or branches during the summer months, in pots filled with fine earth, plunging them in an old tan hot-bed under glasses, carefully shading them from the heat of the sun till perfectly rooted; their striking may be promoted by being covered with small glasses. When they are become well rooted, they should be removed with balls into separate pots filled with loamy mould, placing them in a sheltered shady situation till autumn.

They should be preserved in a good greenhouse in the winter, having as much free air as possible, and in the summer placed in a sheltered warm situation.

The fifth sort may sometimes be preserved in the open ground in such situations.

They produce variety among other potted plants of the green-house kinds.

OXALIS, a genus containing plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Decandria Pentagynia*, and ranks in the natural order of *Gruinales*.

The characters are: that the calyx is a five-parted perianthium, acute, very short, permanent: the corolla five-parted, often cohering by the claws, erect, obtuse, emarginate: border spreading: the stamina have ten capillary filaments, (awl-shaped,) erect; the outer ones shorter: anthers roundish, grooved: the pistillum is a five-cornered germ, superior: styles five, filiform, the length of the stamens: stigmas blunt: the pericarpium is a capsule, five-cornered, five-celled, ten-valved, (Jacqu.) five-valved gaping at the corners longitudinally: the seeds are roundish, flying out covered with a fleshy elastic aril.

The species cultivated are: 1. *O. Acetosella*, Common Wood Sorrel; 2. *O. stricta*, Upright Wood Sorrel; 3. *O. caprina*, Goat's-foot Wood Sorrel; 4. *O. versicolor*, Striped-flowered Wood Sorrel; 5. *O. purpurea*, Purple Wood Sorrel; 6. *O. incarnata*, Flesh-coloured Wood Sorrel.

There are many other species that may be cultivated.

The first has a perennial root, branched, round, knobbed, creeping, with very fine fibrils on every side, partly white, partly red, having an ovate, acute, thick, rigid scale like a tooth at the knobs: stipe partly subterraneous, partly standing out, sometimes very little, sometimes several inches, then procumbent and striking roots into the ground, toothleted at the knobs like the root, round, somewhat hirsute, red, closely toothleted above with the permanent joints of decayed leaves, perennial, putting forth from its top several aggregate leaves and scapes: the petiole jointed, round, somewhat hirsute, red, especially at bottom, from two to three inches long, almost upright but weak: the leaflets subsessile, near half an inch long, wider, green and hirsute on both sides, shortly ciliate: the scapes one or two, jointed at the base, round, somewhat villose, red, the length of the leaves; with embracing, villose, jointed bractes above the middle: the calycine leaflets oblong, acute, sometimes bifid, somewhat hirsute, ciliate, purple at the tip, upright. It is a native of Europe.

There is a variety with purple flowers.

The second species has a perennial, creeping root, round, putting out capillary fibres at the knots, branched: the stems from the root as it creeps along several, roundish, slender, somewhat villose, purplish, finally branched, half a foot high and more, upright, but being weak often lying down, annual: the leaves are alternate, a few sometimes opposite, ternate: the petiole springing from a joint margined in front, round, villose, spreading, from two to four inches long, flaccid: the leaflets subpetioled, somewhat hirsute on both sides with decumbent hairs and green, ciliate, scarcely half an inch long: the peduncles axillary, jointed at the base, round, villose, upright, about the same length with the leaves, having from two to seven flowers in an umbel, with a pedicel often branched. It is a native of North America, flowering from June to October.

The third has the bulb ovate-triangular, even: the stipe subterraneous, terminated by an umbel of leaves and scapes: leaves several: the petiole jointed at the base, channelled, smooth, from two to three inches in length: leaflets obcordate, sessile, green above, bright purple underneath, a third part of an inch in length; lobes oblong, rounded; the scapes several, smooth, erect, slender, half a foot in length, umbelliferous: the leaflets of the involucre few, acute, minute, smooth: peduncles from two to four, one-flowered, sometimes villose, erect, about an inch in length: the flowers of a yellow colour. It is a native of the Cape.

The fourth species has an ovate bulb, half an inch long, covered with a black skin, within which are frequently several bulbs: hence when cultivated it has almost always many stipes: these are out of the ground, have a few scales on them, are round, slender, have a very few hairs scattered over them, are six inches long, sometimes leafless, sometimes having a single leaf at top, when young almost upright, but afterwards wholly procumbent, terminated by a dense umbel of leaves and flowers: leaves several, upright, and spreading a little: petiole jointed at the base, filiform, villose, from one to two inches in length: leaflets subsessile, wedge-form-linear, emarginate, at the edges and underneath appearing somewhat villose when magnified, above smooth and dotted, underneath having two orange-coloured calluses below the tip, about half an inch in length: the scapes several, jointed at the base, round, a little hirsute at top with capitate hairs, in other parts with simple ones, almost upright, longer than the petioles and twice as thick; bractes alternate, approximating, and ciliated at top with capitate hairs: calycine leaflets lanceolate, acute, erect, ciliate and hirsute with capitate or simple hairs, green with the edges blood-red, and two oblong orange-coloured calluses below the tip connected at top. It is a native of the Cape.

The fifth has also an ovate bulb, loose, small, loosely inclosed in a skin, from three to six times the size of the bulb: the stipe subterraneous, from one to three inches long, round, slender, often bulbiferous, terminated by a dense umbel of leaves and flowers: the leaves very many, spreading or lying on the ground: the petiole jointed at the base, densely villose, pale green, from one to three inches long: the leaflets sessile, quite entire, villose at the edges, quite smooth above, underneath somewhat hirsute and much dotted, always green on both sides without any other colour, half an inch and more in length: scapes several, jointed at the base, round, somewhat villose, pale green, almost upright, longer than the leaves: bractes sublinear, sharp, villose, approximately alternate at bottom: the calycine leaflets lanceolate, acute, hirsute, ciliate, with simple hairs, green with blood-red spots at the edges, erect. It is a native of the Cape.

The sixth species has the bulb in the young plant ovate, covered with a brown skin, twice

the size of a pea: the root in the mature plant consists of several legs slenderly fusiform, terminating in a long fibre, round, the thickness of a reed and more, some inches in length, fleshy, brittle, pale, somewhat pellucid and sweet: the stipes very many, herbaceous, round, the thickness of a pigeon's quill, or even of a reed, thick, green or purplish brown, a foot and a half high, upright, but so weak as not to be able to support themselves without assistance, at the base and origin of the branches having an ovate-acuminate stipule; both they and the branches terminated by distant umbels of leaves and flowers: the leaves several, at remote distances in whorls: the petiole jointed at the base, round, slender, smoothish, spreading a little, about two inches in length, green: the leaflets on short petioles, equal, quite entire, flat, spreading very much, about half an inch in length, above green and smooth, underneath dotted, more or less purple-flesh-coloured, appearing densely villose in the magnifier, with a row of orange-dots, becoming black in the dried leaves, and observable only in the microscope with the light thrown on it: the peduncles jointed at the base, axillary, round, pubescent in the magnifier, green, the length of the leaves; with bractes towards the top opposite, erect and jointed: above these nodding and purple.

Culture.—The first sort may be readily increased, by planting the divided roots in a moist shady border in the early spring season; and afterwards they require only to be kept clear from weeds.

The other sorts may be increased, by planting off-sets from the roots or bulbs that come out from the sides of the stems, in pots filled with good light mould, sheltering them in the dry stove or under a frame during the winter, admitting as much free air as possible in mild weather. They only require to be protected in the winter season afterwards, and occasionally removed into other pots.

The two first sorts and varieties may be introduced in the borders, and the others afford variety among other potted plants.

OX-EYE. See BUPHTHALMUM.

OX-SLIP. See PRIMULA.

OXYACANTHA. See BERBERIS.

OXYCEDRUS. See JUNIPERUS.

PÆONIA, a genus comprising plants of the large herbaceous flowery perennial kind.

It belongs to the class and order *Polyandria Digynia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that the calyx is a five-leaved perianthium, small, permanent: leaflets roundish, concave, reflex, unequal in size and situation: the corolla has five roundish petals, concave, narrower at the base, spreading, very large: the stamina have numerous filaments, (about three hundred) capillary, short: anthers oblong, quadrangular, erect, four-celled, large: the pistillum consists of two ovate germs, erect, tomentose: styles none: stigmas compressed, oblong, blunt, coloured: the pericarpium has as many capsules, ovate-oblong, spreading and reflex, tomentose, one-celled, one-valved, opening longitudinally inwards: the seeds several, oval, shining, coloured, fastened to the opening suture.

The species are: 1. *P. officinalis*, Common Peony; 2. *P. tenuifolia*, Slender-leaved Peony.

The first has a thick large root, constituted of several thick fleshy tubers, hanging by strings to the main head, with upright round smooth stems, branching half a yard or two feet in height: the leaves are large, many-lobed, with oblong-oval spreading folioles: the flowers large, deep red or purple, on the terminations of the stalks.

There are two principal varieties: the Common Female and Male Peony.

The former of these has the roots composed of several roundish thick knobs or tubers, which hang below each other, fastened with strings: the stalks are green, about two feet and a half high: the leaves composed of several unequal lobes, which are variously cut into many segments: they are of a paler green than those of the latter sort, and hairy on their under side: the flowers are smaller, and of a deeper purple colour.

The latter has the roots composed of several oblong knobs hanging by strings fastened to the main head: the stems the same height with the preceding: the leaves are composed of several ovate lobes, some of which are cut into two or three segments; they are of a lucid green on their upper side, but are hoary on their under: the stems are terminated by large single flowers, composed of five or six large roundish red petals.

The flowers in both sorts appear in May, and are natives of several parts of Europe, as Switzerland, Dauphiné, Carniola, Piedmont, Silesia, &c.

Miller says, that "it is scarcely necessary to observe that the old names of Male and Female have nothing to do here with the sexes, the flowers of both being hermaphrodite."

There are several subvarieties of the *Female Peony* with double flowers, differing in size and colour, cultivated in gardens. The *Male Peony* also varies with pale, and white flowers, and with larger lobes to the leaves: they also vary much in different countries.

"There is the *Foreign Peony*, with a deep-red flower: the roots are composed of roundish knobs, like those of the *Female Peony:* the leaves are also the same, but of a thicker substance: the stalks do not rise so high: the flowers have a greater number of petals, and appear a little later. It is a native of the Levant. The large double purple Peony is probably a subvariety of this."

The *Hairy Peony*, with a larger double red flower: the roots like the common Female Peony; but the stalks taller, and of a purplish colour: the leaves much longer, with spear-shaped entire lobes: the flowers large, and of a deep red colour.

The *Tartarian*, with roots composed of oblong fleshy tubers of a pale colour: the stalks about two feet high, pale green: the leaves composed of several lobes, irregular in shape and size, some having six, others eight or ten spear-shaped lobes, some cut into two or three segments, and others entire; of a pale green, and downy on their under side: the stalks are terminated by one flower of a bright-red colour, a little less than that of the common Female Peony, having fewer petals.

The *Portugal Peony*, with a single sweet flower, has not roots composed of roundish tubers, but has two or three long taper forked fangs like fingers: the stalk rises little more than a foot high: the leaves are composed of three or four oval lobes, of a pale colour on their upper side, and hoary underneath: the stalk is terminated by a single flower, which is of a bright red colour, smaller than the above, and of an agreeable sweet scent.

The second species has a creeping root, putting forth tuberous fibres, with tubercles the size of a hazel nut, white, fleshy, of a bitterish taste: the stem scarcely a foot high, and commonly single, but in the garden eighteen inches high, and several from the same root: the root-leaves none: the stem round, very obscurely grooved, smooth, as is the whole plant, naked at bottom, having there only a few sheathing scales: the leaves frequent, alternate, the upper ones gradually less, on a round petiole, channelled above, quinate: the leaflets cut into very many narrow segments: the upper leaves simply multifid: the flower sessile at the uppermost leaf, subglobular, accompanied by two leaflets, one multifid, the other simple, both dilated at the base. It is a native of the Ukraine.

Culture.—The single sorts are easily raised by seed, and the double by parting the roots.

The seed should be sown in autumn, soon after it is perfectly ripened, or very early in the spring, (but the former is the better season,) on a bed or border in the open ground where the soil is rather light, raking it in lightly. It may also be sown in small drills.

The plants should afterwards be properly thinned, kept perfectly free from weeds, and be occasionally watered when the weather is hot and dry.

As they should remain two seasons in the beds, it is necessary in the second autumn to spread some light mould over them, to the depth of an inch; and in the autumn following they may be removed where they are to remain. Plants of the double-flowered kinds are often produced from these.

The roots of the old double-flowered plants may be taken up in the beginning of the autumn, and divided so as to have one bud or eye or more to each part, or crown, as without care in this respect they never form good plants. And where regard is had to the flowering, they should not be too much divided, or the off-sets made too small, as when that is the case they do not flower strong. But where a great increase is wanted, they may be divided more, being left longer in the nursery-beds.

They should be planted out as soon as possible after they are separated, though when necessary they may be kept some time out of the earth. The large off-sets may be set out at once where they are to remain; but the small ones are best set in nursery-beds for a year, or till of proper strength for planting out.

The plants may afterwards be suffered to remain several years unremoved, till the roots are increased to very large bunches, and then be

taken up, when the stalks decay, in autumn, divided, and replanted in their allotted places in the manner directed above.

All the sorts are hardy plants, that are capable of flourishing in any common soil in almost any situation, either in open exposures or under the shade of trees.

The Portugal variety, however, should have a warmer situation and lighter soil than the others.

They are proper ornamental flowery plants for large borders, and may be had at all the public nurseries. In planting, one should be put here and there in different parts, placing them with the crowns of the roots a little within the surface of the earth, and at a yard at least distant from other plants, as they extend themselves widely every way, assuming a large bushy growth; and, together with their conspicuous large flowers, exhibt a fine appearance, and are often planted at the terminating corners of large borders adjoining principal walls, displaying a bushy growth in their foliage and flowers. When the flowers are gone, the capsules opening lengthways discover their coloured seeds very ornamentally, especially in that called the Male Peony and varieties. And to forward this, the capsules may be slit open on the inside at the proper valve; whereby they will expand much sooner, and display their beautiful red seed more conspicuously.

PAINTED LADY PEA. See LATHYRUS.

PALM TREE. See CHAMÆROPS and COCOS.

PALMA CHRISTI. See RICINUS.

PALMETTO. See CHAMÆROPS.

PANAX, a genus containing plants of the herbaceous and shrubby perennial kinds.

It belongs to the class and order *Polygamia Dioecia* (*Pentandria Digynia*), and ranks in the natural order of *Hederaceæ*.

The characters are: that in the hermaphrodite flowers the calyx is a simple umbel, equal, clustered: involucre many-leaved, awl-shaped, small, permanent: perianthium proper, very small, five-toothed, permanent: the corolla universal uniform: proper, of five oblong equal recurved petals: the stamina have five filaments, very short, caducous: anthers simple: pistillum a roundish germ, inferior: styles two, small, upright: stigmas simple: the pericarpium is a cordate berry, umbilicate, two-celled: the seeds solitary, cordate, acute, plano-convex: male flowers on a distinct plant: the calyx is a simple umbel, globular; with very many equal coloured rays: involucre composed of lanceolate sessile leaflets, the same number with the external rays: perianthium turbinate, quite entire, coloured: the corolla has five petals, oblong, blunt, narrow, reflex, placed on the perianthium: the stamina have five filaments, filiform, longer, inserted into the perianthium: anthers simple.

The species cultivated are: 1. *P. quinquefolia*, Ginseng; 2. *P. trifolia*, Three-leaved Panax; 3. *P. aculeata*, Prickly Panax.

The first has a fleshy taper root as large as a man's finger, jointed, and frequently divided into two branches, sending off many short slender fibres: the stalk rises near a foot and half in height, and is naked at the top, where it generally divides into three smaller foot-stalks, each sustaining a leaf composed of five spear-shaped leaflets, serrate, pale green and a little hairy: the stalk is erect, smooth, round, simple, tinged of a deep purple colour: the leaves arise with the flower-stem from a thick joint at the extremity of the stalk; are generally three, but sometimes more: the five leaves into which each of these is divided are of an irregular oval shape, veined, pointed, smooth, deep green above, on short foot-stalks, from a common petiole, which is long, round, and almost erect: the flowers grow on a slender peduncle, just at the divisions of the petioles, and are formed into a small umbel at the top; they are of an herbaceous yellow colour, and appear at the beginning of June: the berries are first green, but afterwards turn red; and inclose two hard seeds, which ripen in the beginning of August, or soon afterwards. It is a native of Chinese Tartary.

The second species has the stem single, not more than five inches high, dividing into three foot-stalks, each sustaining a trifoliate leaf, with the leaflets longer, narrower, and more deeply indented on their edges than in the first species: the flower-stalk rises, as in that, from the divisions of the petiole. It is a native of North America.

It is so nearly allied to the first sort, that Linnæus doubts whether it be any thing more than a variety of that, only much smaller.

The third is a shrub with a recurved prickle at the base and at the tip of the petioles: the leaves are solitary, ternate, tern at the flowers; with ovate, blunt leaflets: the umbels are peduncled, hemispherical, and simple: the flowers with three styles. It is a native of China.

Culture.—The first and second sorts are increased by sowing the seeds procured from abroad upon a moderate hot-bed, or in pots plunged into it, in the early spring season; and when the plants have acquired a few inches in growth, removing them into beds or borders where the mould is good, and the situations sheltered.

The third sort is increased by layers or cuttings, laid down or planted out in the summer months in pots, and plunged in the bark-bed of the stove. When they have stricken root, they may be removed into separate pots, and be constantly kept in the stove.

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Engraved by F. Sansom

1 *Pancratium maritimum.*
Sea Pancratium.

2 *Soldanella alpina*
Alpine Soldanella

The two first sorts afford variety in the borders, and the last among stove collections.

PANCRATIUM, a genus containing plants of the bulbous-rooted flowery perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Spathaceæ*.

The characters are: that the calyx is an oblong spathe, obtuse, compressed, opening on the flat side, shrivelling: the corolla has six petals, lanceolate, flat, inserted into the tube of the nectary on the outside above the base: nectary one-leafed, cylindric-funnel-form, coloured at top, with the mouth spreading and twelve-cleft: the stamina have six filaments, awl-shaped, inserted into the tips of the nectary, and longer than they are: anthers oblong, incumbent: the pistillum is a bluntly three-cornered germ, inferior: style filiform, longer than the stamens: stigma blunt: the pericarpium is a roundish capsule, three-sided, three-celled, three-valved: the seeds several, globular.

The species cultivated are: 1. *P. maritimum*, Sea Pancratium; 2. *P. Illyricum*, Illyrian Pancratium; 3. *P. Zeylanicum*, Ceylonese Pancratium; 4. *P. Mexicanum*, Mexican Pancratium; 5. *P. Caribæum*, Caribean Pancratium; 6. *P. Carolinianum*, Carolina Pancratium; 7. *P. Amboinense*, Broad-leaved Pancratium; 8. *P. verecundum*, Narcissus-leaved Pancratium.

The first has a large, coated, bulbous root, of an oblong form, covered with a dark skin: the leaves are shaped like a tongue; are more than a foot long, and one inch broad, of a deep green, six or seven of them rising together from the same root, encompassed at bottom with a sheath: between these arises the stalk, which is a foot and half long, naked, sustaining at the top six or eight white flowers, inclosed in a sheath, which withers and opens on the side, to make way for the flowers to come out.

According to Mr. Miller, the root resembles that of the Squill, but is less, covered with a brown skin, and white within, the coats pellucid and gently striped, viscid or full of a clammy juice, bitter to the taste without acrimony. It is a native of the South of Europe.

The second species has a large bulb, covered with a dark skin, sending out many thick strong fibres, striking deep in the ground: the leaves are a foot and half long and two inches broad, of a grayish colour: the scapes thick, succulent, near two feet high: the flowers six or seven, white, shaped like those of the first sort, but with a shorter tube, and much longer stamens. It flowers in June, and frequently produces seeds. It is a native of the South of Europe.

The third has a pretty large bulbous root: the leaves long and narrow, of a grayish colour, and pretty thick, standing upright: the stalk rises among them, a foot and half high, naked, sustaining one flower at the top: the nectary is large, cut at the brim into many acute segments: the stamens long, and turning towards each other at their points; in which it differs from the other species: the flower has a very agreeable scent, but is of short duration. It is a native of Ceylon.

The fourth species has the stem or scape a long span in height, round, forked towards the top, or dividing into two peduncles, with two oblong tender membranaceous greenish leaflets, and terminated each with a white flower, divided to the very base into six narrow segments; in the middle of these is a white bell-shaped tube, which Linnæus names the nectary, more tender than the petals; the mouth angular, and from each angle putting forth a filament, long, slender and white, terminated by an oblong incurved saffron-coloured anther: the flowers have no smell, and shrivel up over the fruit: leaves four, reclining, smooth, pale green and somewhat glaucous, ridged, slightly grooved in the middle, and with a single streak on each side, otherwise veinless, a long span or a little more in length, an inch or an inch and half in width, produced to a point at the end. It flowers in May.

The fifth has the leaves about a foot long and two inches broad, having three longitudinal furrows: the stalk rises about a foot high, then divides like a fork into two small foot-stalks, or rather tubes, which are narrow, green, and at first encompassed by a thin spathe, which withers, and opens to give way to the flowers: these are white, and have no scent. It is a native of the West Indies.

The sixth species has a roundish bulbous root, covered with a light brown skin, from which arise several narrow dark green leaves, about a foot long: among these comes out a thick stalk (scape) about nine inches high, sustaining six or seven white flowers, with very narrow petals, having large bell-shaped nectariums or cups, deeply indented on their brims: the stamens do not rise far above the nectarium. It is a native of Jamaica and Carolina.

The seventh has the bulb oblong, white, sending out several thick fleshy fibres, which strike downward: the leaves are on very long foot-stalks, some ovate, others heart-shaped, about seven inches long and five broad, ending in points, having many deep longitudinal furrows; they are of a light green, and their borders turn inwards: the stalk thick, round and succulent, rising near two feet high, sustaining at the top several white flowers, shaped like those of

the other sorts; but the petals are broader, the tube is shorter, and the stamens are not so long as the petals: there is a thin sheath, which splits open longitudinally. It is a native of Amboyna.

There are several varieties: as the *American*, which grows naturally in the islands of the West Indies, where it is called *White Lily*; and the *latifolium* and *ovatum* also grow naturally in the same place.

The eighth species has the leaves a foot and a half long, half an inch wide: the scape erect, compressed, a foot high: the spathes oblong-lanceolate, acuminate, whitish, shrivelling; the outer larger, an inch and half in length: the flowers fragrant, on three-cornered pedicels, scarcely half an inch long. It is a native of the East Indies; flowering from June to August.

Culture.—All these plants are capable of being increased by planting off-sets from the roots in the latter end of summer, when their stems and leaves decay. The roots may be divided every second or third year.

In the two first sorts, the off-sets may be planted out in nursery-beds for a year or two, to become sufficiently strong, when they may be removed into warm sheltered dry borders; the first being sheltered from frost in severe winters, and the latter in very severe weather, by being covered with tanner's bark, straw, or peas-haulm. The second sort may also be increased by seeds sown in pots, and plunged in a hot-bed.

The other sorts must be planted out in small pots filled with light earth, separately plunging them in the bark-bed of the stove. They should be kept constantly in the tan-bed, and have the management of other tender bulbs. In this way they generally succeed well.

The two first sorts afford variety in the dry warm borders of the pleasure-ground, and the other kinds produce variety as well as fragrance in the stove collections.

PANDANUS, a genus containing a plant of the herbaceous perennial exotic kind, for the stove.

It belongs to the class and order *Dioecia Monandria*.

The characters are: that in the male the calyx has alternate spathes, sessile, serrate-spiny: spadix decompound, naked: perianthium proper none: corolla none: the stamina have very many filaments, solitary, placed scatteredly on the outer ramifications of the spadix, very short: anthers oblong, acute, erect: in the female, the calyx has four spathes, terminating, converging: spadix globular, covered with numerous fructifications, scarcely included: perianthium none: there is no corolla: the pistillum has numerous aggregate germs, sessile, five-cornered, convex at top, smooth: style none: stigmas two, cordate, margined: the pericarpiuma sub-globular fruit, large, consisting of numerous wedge-shaped drupes, convex at top, angular, farinaceous, one-seeded: the seed solitary, oval, even, in the centre of the drupe.

The species is *P. odoratissimus*, Sweet-scented Pandanus, or Screw Pine.

This is sometimes found with a single and pretty erect trunk of ten feet in height, and a branching round head; but is generally in form of a very large, branching, spreading bush. From the stems or larger branches issue large carrot-shaped blunt roots, descending till they come to the ground, and then dividing: the substance of the most solid is something like that of a cabbage stalk, and by age acquires a woody hardness on the outside: the leaves are confluent, stem-clasping, closely imbricated in three spiral rows, round the extremities of the branches, bowing, from three to five feet long, tapering to a very long fine triangular point, very smooth and glossy; margins and back armed with very fine sharp spines; those on the margins point forward; those of the back point sometimes one way, sometimes the other.

The male flowers are in a large, pendulous, compound, leafy raceme, the leaves of which are white, linear-oblong, pointed and concave.

The female flowers are on a different plant, terminating and solitary, having no other calyx or corolla than the termination of the three rows of leaves forming three imbricated fascicles of white floral leaves, like those of the male raceme, which stand at equal distances round the base of the young fruit. It is a native of the warmer parts of Asia, flowering chiefly during the rainy season; it is much employed there for hedges, and answers well, but takes much room. The tender white leaves of the flowers, chiefly those of the male, yield that most delightful fragrance for which they are so generally esteemed; and of all the perfumes, it is by far the richest and most powerful.

Culture.—This plant may be increased by sowing the seeds, brought from the places where it grows naturally, in pots of light earth, and plunging them in the bark-bed of the stove, where they must be constantly retained, having the management usually practised for other tender exotic plants.

They have a fine ornamental effect among other stove plants, in their large spreading foliage.

PAPAVER, a genus containing plants of the hardy herbaceous fibrous-rooted annual and perennial kinds.

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Rhoeadeæ*.

The characters are: that the calyx is a two-leaved perianthium, ovate, emarginate: leaflets subovate, concave, obtuse, caducous: the corolla has four roundish petals, flat, spreading, large, narrower at the base; alternately less: the stamina have numerous filaments, capillary, much shorter than the corolla: anthers oblong, compressed, erect, obtuse: the pistillum has a roundish, large germ: style none: stigma peltate, flat, radiate: the pericarpium is a crowned capsule, with the large stigma, one-celled, half-many-celled, opening by many holes at the top under the crown: the seeds numerous, very small: receptacles, longitudinal plaits, the same number with the rays of the stigma, fastened to the wall of the pericarpium.

The species cultivated are: 1. *P. somniferum*, White Poppy; 2. *P. Rhoeas*, Corn or Red Poppy; 3. *P. Cambricum*, Welsh Poppy; 4. *P. Orientale*, Oriental Poppy.

The first has the stalks large, smooth, five or six feet high, branching: the leaves large, grayish, embracing at the base, irregularly jagged on their sides: the flowers terminating, whilst inclosed in the calyx hanging down, but before the corolla expands becoming erect: the calyx is composed of two large oval grayish leaves, that separate and soon drop off: the corolla is composed of four large, roundish, white petals, of short duration; and succeeded by large roundish heads as big as Oranges, flatted at top and bottom, and having an indented crown or stigma: the seeds are white. It is a native of the southern parts of Europe, but probably originally from Asia.

There are several varieties, differing in the colour and multiplicity of their petals, which are preserved in gardens for ornament: the Single-flowered sort is chiefly cultivated for use.

The Common Black variety of Poppy has stalks about three feet high, smooth, and dividing into several branches: the leaves are large, smooth, deeply cut or jagged on their edges, and embracing: the petals purple with dark bottoms; succeeded by oval smooth capsules filled with black seeds, which are sold under the name of *Maw-seed*.

Of this there are many sub-varieties: as with large double flowers, variegated of several colours; with red and white, purple and white, and some finely spotted like Carnations.

There are few plants whose flowers are so handsome; but as they have an offensive scent, and are of short duration, they are not in general much regarded: they are annual, flowering in June.

The second species has the stem from one to two feet high, upright, round, branched, purplish at bottom, with spreading hairs, bulbose at the base: the leaves are sessile, forming a kind of sheath at bottom, hairy on both sides; the segments or leaflets unequally toothed or serrate, each tooth rolled back at the edge, callous at top, and terminated by a small spine: the peduncles long, round, upright, one-flowered, red, the hairs on it spreading horizontally. It is a native of every part of Europe, &c. flowering from June to August.

There is a variety with an oval black shining spot at the base of each petal, from which many beautiful garden sub-varieties are produced which have double flowers, white, red bordered with white, and variegated.

In the third the stalks are a foot high, and smooth: the pinnas of the leaves are deeply cut on their edges; and there are a few small leaves on the stalk shaped like the lower ones: the upper part of the stalk is naked, and sustains one large yellow flower, appearing in June; being filled with small purplish seeds. It is a native of Wales, &c.

The fourth species has a perennial root, composed of two or three strong fibres as thick as a man's little finger, a foot and a half long, dark brown on the outside, full of a milky juice, which is very bitter and acrid: the leaves a foot long, closely covered with bristly white hairs: the stems two feet and a half high, very rough and hairy, having leaves towards the lower part like the root-leaves, but smaller: the upper part is naked, and sustains at the top one very large flower, of the same colour with the common red sort. It was found in Armenia, and flowers here in May.

There are a few varieties, differing in the colour of the flowers; and it is said that the flower is sometimes double, but with us it is always single.

Culture.—All the different sorts may be increased by seeds, and the two last sorts also by parting and planting out the roots.

The seeds should be sown in the autumn, or very early in the spring, (but the former is the better season,) either in the places where the plants are to grow, or in beds, to be afterwards planted out. The first is probably the best method, as these plants do not bear removing well.

When they are cultivated for ornament, seed of the finest double sorts should be carefully provided and made use of, and be sown in patches.

In the practice of Mr. Ball in cultivating the first

sort for the purpose of preparing opium from it, "the seed was sown at the end of February, and again the second week in March, in beds three feet and a half wide, well prepared with good rotten dung, and often turned or ploughed, in order to mix it well, and have it fine, either in small drills, three in each bed, or broadcast; in both cases, thinning out the plants to the distance of a foot from each other, when about two inches high, keeping them free from weeds." They produced from four to ten heads each, and showed large flowers of different colours. "With an instrument something like a rake, but with three teeth, the drills may, he says, be made at once." He found that the plants did not bear transplanting; as, out of 4000 which he transplanted, not one plant came to perfection.

The roots of the two last sorts may be divided in the autumn, or spring, (but the first period is the better,) leaving some root fibres to each parting, planting them out where they are to remain, as soon afterwards as possible.

In all the sorts the plants only require afterwards to be kept free from weeds, and those raised from seed properly thinned out.

They all afford ornament and variety in the clumps, borders, and other parts of pleasure grounds and gardens; and the first sort may sometimes be grown to advantage for the purpose of having the juice which it affords made into opium.

PAPAW-TREE. See CARICA.

PAPER-FRAMES, such as are formed with oiled paper upon a slight frame-work of thin slips of wood.

They are useful for several purposes in the early spring and summer season; such as in defending late hot-beds, and sometimes in particular natural ground beds of curious tender plants, seeds, cuttings, &c.

In making them when formed as above, either in a ridge manner, with two sloping sides, longways, or arch-fashion, in dimensions from five to ten feet in length, three to four in width, and two to three feet in perpendicular height; the wood-work is covered with large sheets of strong white paper pasted on securely, and when dry, brushed over regularly with linseed oil, to resist and shoot off the falling wet of rains and dews, and to render them more pellucid, so as to admit the rays of light and the heat of the sun in a proper degree. When thus prepared and perfectly dry, they are ready for placing over the beds, for the purposes required; in which the paper continues durable generally only one season; but the frame-work will last several years, by being fresh papered.

These kinds of temporary Frames are also useful in some of the hand-glass crops of melons, and occasionally in those of cucumbers, but more generally in the former; which after having advanced in growth, to fill and extend beyond the compass of the hand-glasses, they should be removed, and the Paper-frames placed over the bed, covering it wholly in width and length, the runners of the plants being trained out regularly along the surface; continuing them constantly over the plants, which are thereby protected from external injuries, and inclement weather, either cold or excessive rains, winds, &c., likewise from the too powerful heat of the sun. See CUCUMIS MELO.

They may also be used for late hot-bed cucumbers, when in want of garden-frames or hand-glasses for the purpose, being placed over the bed, at once, finally to remain: and with proper care in giving occasional air, water, and covering over the frames with mats in cold nights, and very hard rains, &c., cucumbers may be raised in a tolerable manner.

They may likewise be employed occasionally, in default of others, in the raising most of the less hardy or tenderer annuals, both in sowing them in hot-beds and warm borders of natural earth.

Paper-frames may likewise be used advantageously in pricking-out many sorts of small tender seedling plants in the hot summer months, to defend them from casual unfavourable night air, heavy rains, &c., and afford a fine growing shade from the hot rays of the mid-day sun. The same kind of frames may still further be beneficial in raising many sorts of tender exotics, from small cuttings and slips in summer, both of the woody, herbaceous and succulent kinds, either planted in hot-beds or in the natural earth, as the different kinds may require; which being covered close with them, they exclude the outward air, admit the light and influence of the sun in a proper degree, and at the same time afford a peculiar kindly shade.

They are chiefly made in the forms mentioned above, in an open manner, having the ribs or spars twelve inches asunder, first forming a bottom frame, rather stronger than the other parts, with a ridge-piece supported at a proper height, extending longways in the middle; then narrow side rafters, arranged from the bottom to the ridge rail at top, a foot distant, both for the advantage of pasting the paper regularly, and to admit a proper degree of light between them, through the paper: but when of great length, it is proper to have one or two pannels on one side, eighteen inches or two feet in width, to open outward with hinges, convenient

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1 *Papaver Orientale*
Eastern Poppy

2 *Pulmonaria virginica*
Virginian Lung-wort

for admitting air, and performing other occasional culture: the whole being thus formed in the wood work, it is then proper to extend lines of packthread cross-ways of the ribs, going round each, level or even with the upper surface of the frame, continuing two or three rows a foot asunder, from the lower part upward, drawing other lines, crossing and intersecting these at the same distance, regularly between the ribs of the frame-work; which arrangement of the lines is of essential service for the more effectual support of the paper when pasted on the frame, and strengthening it against the power of winds and heavy rains. The paper for this use should be of the larger strong printing or demy kind; which, previously to pasting on the frame, should be moderately damped with water, that it may not sink in hollows after being fixed; and as soon as thus prepared it should be pasted on, sheet and sheet, in a regular manner, one large sheet and a half, or two at most, generally ranging from bottom to top, contriving to have whole ones along the ridge-rails above, extending lengthways and across, placed conveniently to join regularly with the other sheets below; and if, at the intersections of the packthreads, a small square or round bit of the same paper be pasted on the inside to the main sheets over that part of the packthread, it will give it additional strength against rain and wind.

When the paper is thus pasted on, and perfectly dry, it must be oiled over with linseed oil, either raw or boiled: the latter is however rather apt to harden the paper, and more liable to crack or break: it may be applied by means of a painter's soft clean brush, dipping lightly, and brushing the outside of the paper all over, equally in every part; then placing the frame in some dry covered shed, to remain till the whole is thoroughly dry; when it may be used.

Though these sorts of frames may be cheap, and answer many little purposes of the gardener, they are not by any means so useful as those made with glass.

PARIETARIA, a genus containing a plant of the shrubby kind for the green-house.

It belongs to the class and order *Polygamia Monoecia*, and ranks in the natural order of *Scabridæ*.

The characters are: that the hermaphrodite flowers are two, contained in a flat six-leaved involucre: the two opposite and outer leaflets larger: the calyx is a one-leafed perianthium, four-cleft, flat, blunt, the size of the involucre halved: there is no corolla, unless the calyx be called so: the stamina have four awl-shaped filaments, longer than the flowering perianthium and expanding it, permanent: anthers twin: the pistillum is an ovate germ: style filiform, coloured: stigma pencilform, capitate: there is no pericarpium: perianthium elongated, larger, bell-shaped, the mouth closed by converging segments: the seed one, ovate: female flower one, between the two hermaphrodites, within the involucre: the calyx as in the hermaphrodites: there is no corolla: the pistillum as in the hermaphrodites: there is no pericarpium: perianthium thin, involving the fruit: the seed, as in the hermaphrodites.

The species cultivated is *P. arborea*, Tree Pellitory.

It is an upright soft shrub, the height of a man: the root woody, branched, fibrous, rufescent: the stem woody, upright, round, the bark full of chinks, ash-coloured: branches and branchlets alternate, spreading, villose, pithy: the shoots red, very villose with hoary hairs: the leaves alternate, spreading, entire, nerved, three-nerved above the base, veined: nerves and veins prominent underneath, grooved above, somewhat wrinkled, the younger ones very much so, underneath villose soft, above bright green, scarcely paler beneath, from four to six inches long, and from two to four wide: the flowers commonly three, clustered, from the axil of each bracte, sessile, in the male yellow, in the female red herbaceous. According to L'Heritier, the male and female flowers are on different plants. It is a native of the Canary islands, flowering from February to May.

Culture.—This may be increased by planting cuttings of the young shoots in the summer season, watering them occasionally till they have stricken root. When the plants are well rooted, they may be removed with balls about their roots into separate pots, and have the constant protection of the green-house.

They afford variety in these collections.

PARKINSONIA, a genus containing a plant of the exotic flowering tree kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Lomentaceæ*.

The characters of which are: that the calyx is a one-leafed perianthium; at the base bell-shaped flattish, permanent: border five-parted: segments lanceolate-ovate, acute, coloured, reflex, almost equal, deciduous: the corolla has five petals, with claws, almost equal, spreading very much, ovate: the lowest kidney-form: claw upright, very long: the stamina have ten awl-shaped filaments, villose below, declined: anthers oblong, incumbent: the pistillum is a round germ, long, declined: style filiform, rising, the length of the stamens: stigma blunt: the pericarpium is a legume very long, round,

swelling over the seeds, (whence it is necklace-form,) acuminate: the seeds several, one to each joint of the legume, oblong, subcylindric, blunt.

The species is *P. aculeata*, Prickly Parkinsonia.

It is a small tree, with a trunk ten or twelve feet high, unarmed, even: the branches long, subdivided, flexuose, prickly, strict: the prickles two opposite at the sides of the petioles, one between them three times as long as the others, awl-shaped, upright: the leaves alternate, in fours from the same bud, pinnate, very long, linear: general petioles linear, thicker at the base, flat, somewhat convex, spreading, very smooth: leaflets extremely small, on very short petioles, ovate, smooth: racemes terminating and axillary, solitary, shorter than the leaves, erect, (eight to ten,) many-flowered: flowers alternate, scattered, yellow, on long pedunc'es. In Jamaica it is called *Jerusalem Thorn*. It was first introduced there from the main, but now grows wild in many parts, and in the other islands of the West Indies, where it was originally cultivated for inclosures: it seldom rises above eight feet in height, and is well supplied with strong thorns on every part: the branches are flexile and small, and the trunk seldom grows to any considerable thickness. It flowers several times in the year, and is said to bear long slender bunches of yellow flowers, hanging down like those of laburnum: they perfume the air to a considerable distance; for which reason the inhabitants of the West Indies plant them about their houses.

Culture.—It is capable of being increased by sowing the seeds in pots filled with light rich mould, early in the spring season, plunging them in a hot-bed. When the plants have attained a few inches in growth, they should be carefully removed into other small pots, separately re-plunging them in the hot-bed, shading them till fresh rooted, when fresh air should be admitted according to the warmth of the season. The only method by which these plants have been kept with success through the winter, in this climate, has been by hardening them in July and August to bear the open air; and in September placing them on shelves in the dry stove, at the greatest distance from the fire, so that they may be in a very temperate state of warmth.

These plants afford ornament among other potted plants of the stove kind.

PARTERRE, a spacious level plot of ground in the pleasure garden, divided into many little partitions of different figures and dimensions; by means of edgings or lines of dwarf-box, or by verges of grass turf, with fine gravel walks between, &c. This sort of works were formerly in great estimation, and were commonly situated directly in the front of the house, generally the whole width and sometimes more, extending proportionably in length: and where the intermixture of the figures is artfully disposed, they strike the eye very agreeably, and afford an ornamental effect at all seasons.

The general figure of a Parterre is an oblong or long square, about as long again as broad: a level open spot in some conspicuous part, as above, is mostly chosen for the purpose: first forming a long bed or border of earth, all round, for a boundary; the internal space within this border being then traced out into various little partitions, or inclosures, artfully disposed into different figures corresponding to one another, such as long squares, triangles, circles, various scroll-works, flourishes of embroidery, and various other devices; all of which are formed either by lines of dwarf-box, with intervening alleys and tracks of turf, sand, fine gravel, small shells, &c. as above, or formed sometimes entirely of verges of fine turf, disposed into wide or narrow compartments, as the figure may require: and sometimes they consist of box-edgings, and tracks of turf together; the partitions or beds of earth formed by the tracks of box and turf, &c., being planted with some choice flowers; but no large plants to hide the form, as the regularity of it, in the artful distribution of the different figures, is intended as a decoration to the whole place long after the season of the flowers is over. Some prefer Parterres composed entirely of turf and beds of earth, perfectly even, without any other figure than the long square, forming a border of earth all round, within which are spots of grass, and beds or borders of earth of different sizes. And sometimes Parterres, with box-edgings, are formed into labyrinths or mazes; and some are made to represent coats of arms with the proper supporters. All crowded designs, however, lose their effect.

Works of this sort are now almost wholly in disuse in this country: however, for the sake of variety, they may still be admitted, though not immediately in the front of the house.

PARTING ROOTS, the practice of dividing the roots of some sorts of plants in order to their being set out; which is an expeditious mode of increasing a great number of fibrous-rooted perennial plants. A great number of herbaceous-, fibrous-, and tuberous-rooted perennial plants often increase by the root into large clusters or bunches, composed of numerous small slips or off-sets, particularly many of the flowery tribe, such as the campanula, perennial sunflower, golden-rod, perennial aster, polyanthus, and daisy, balm, mint, burnet, cives, and penny-

royal, with innumerable other sorts; which from one small slip or off-set of the root, often in a season or two multiply into a large cluster of such off-sets; and these clusters of roots being parted into several separate slips, with root-fibres at their bottom, and one or more buds at top, each commences a distinct plant; so that, by parting the roots in this way, one plant may instantly be multiplied into many, each of which becomes alike in growth and general habit to the original, and all flower the ensuing season in their due course; and in their turns detach from their sides all around, a due supply of off-sets for further propagation.

The best general season for Parting Roots is in the latter end of summer or autumn, after they have done flowering, and the stalks are decayed; which is in August, and the two following months; in which, when the detached off-sets are planted directly, they will take good root before winter. But in many hardy sorts it may be performed almost any time, in open weather, from September till March; and some of the tender kinds succeed best in spring. In these cases it should, however, be done before they begin to shoot forth their stalks or advance considerably in their spring shoots.

In performing the business, when any plant designed to be increased has multiplied by its roots into a cluster of off-sets, the whole may either be taken up entirely, and the root parted into as many slips as are furnished with fibres, &c., or a quantity of slips may be detached from the sides all around as the parent plant stands in the ground: in either method, the work may in many sorts be effected easily with the hand; and in others by the assistance of a knife, &c. And when it is wanted to make as great an increase as possible, the root may be parted into as many slips as may be convenient, provided each is furnished with some fibre or root-part, and crowned with one or more buds or eyes for forming shoots at top. But in the flowery tribe, when the detached off-sets are wanted for flowering as strong as possible the ensuing season, they should not be parted too small, but into middling-sized slips, where practicable; which being planted in the proper places will flower in tolerable perfection in the following season. The slips should generally be planted directly by dibble; the very small ones in nursery-beds to stand till next autumn, to acquire strength: then transplanted with balls into the places where they are to remain; but the larger ones at once where they are to grow.

This method may be practised in many sorts annually, as numbers of the herbaceous perennials multiply in one season into large bunches.

PARSLEY. See APIUM.

PARSNEP. See PASTINACA.

PARTHENIUM, a genus containing plants of the annual and perennial kinds.

It belongs to the class and order *Monoecia Pentandria*, and ranks in the natural order of *Nucamentaceæ*.

The characters are: that the calyx is a common quite simple perianthium, five-leaved, spreading: leaflets roundish, flat, equal: the corolla compound convex: corollets hermaphrodite many in the disk: females five in the ray, scarcely surpassing the others: proper of the hermaphrodites one-petalled, tubular, erect, with the mouth five-cleft, the length of the calyx: of the females one-petalled, tubular, ligulate, oblique, blunt, roundish, the same length with the other: the stamina in the hermaphrodites—filaments five, capillary, the length of the corollet: anthers as many, thickish, scarcely cohering: the pistillum of the hermaphrodite—germ below the proper receptacle, scarcely observable: style capillary, generally shorter than the stamens: stigma none: of the female, germ inferior, turbinate-cordate, compressed, large: style filiform, the length of the corollet: stigmas two, filiform, the length of the style, spreading a little: there is no pericarpium: calyx unchanged: seeds in the hermaphrodites abortive; in the females solitary, turbinate-cordate, compressed, naked: the receptacle scarcely any, flat: chaffs separate the florets, so that each female has two hermaphrodites behind.

The species are: 1. *P. Hysterophorus*, Cut-leaved Parthenium, or Bastard Feverfew; 2. *P. integrifolium*, Entire-leaved Parthenium.

The first is an annual plant, growing wild in great plenty in the island of Jamaica, where it is called Wild Wormwood; and thrives very luxuriantly about all the settlements in the low lands. It is observed to have much the same qualities with Feverfew. It flowers here in July and August.

The second species is a perennial plant, which dies to the ground every autumn, and shoots up again the following spring. It rises three feet and more, with thick, round, fleshy stems: the leaves half-embracing, hirsute, not hairy, somewhat paler underneath, with frequent oblique veins or nerves: root-leaves large and long, on keeled petioles: the flowers grow in a corymb at the ends of the stem and branches: the heads are snow-white above, like those of Gnaphalium, whitish green below, and villose at first. It is a native of Virginia, flowering in July, but seldom produces good seeds in this climate.

Culture.—The first sort may be increased by

sowing the seeds on a hot-bed early in the spring; and when the plants come up, transplanting them upon another hot-bed, about five or six inches distant, giving them water and shade until they have taken new root; after which, they must have a pretty large share of fresh air in warm weather, by raising the glasses of the hot-bed every day, and be duly watered every other day at least. When the plants have grown so as to meet each other, they should be carefully taken up, preserving a ball of earth to their roots, and each planted into a separate pot filled with light rich earth; and be plunged into a moderate hot-bed till fresh rooted; after which they may be exposed, with other hardy annual plants, in a warm situation, where they will flower in July: but if the season should prove cold and wet, it will be proper to have a plant or two in shelter, either in the stove, or under tall frames, in order to have good seeds, if those plants which are exposed should fail.

The second sort may be increased by parting the roots in autumn, and be planted in the full ground, where it will abide the cold of our ordinary winters.

They afford ornament in the borders and among potted plants.

PASQUE-FLOWER. See ANEMONE.

PASSERINA, a genus containing plants of the shrubby exotic evergreen kind.

It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Vepreculæ*.

The characters are: that there is no calyx: the corolla is one-petalled, shrivelling: tube cylindrical, slender, ventricose below the middle: border four-cleft, spreading: segments concave, ovate, blunt: the stamina have eight filaments, bristle-shaped, the length of the border, placed upon the point of the tube: anthers subovate, erect: the pistillum is an ovate germ, within the tube of the corolla: style filiform, springing from the side of the very point of the germ, the same length with the tube of the corolla: stigma capitate, hispid all over with villose hairs: the pericarpium is coriaceous, ovate, one-celled: the seed single, ovate, acuminate at both ends, with the points oblique.

The species cultivated are: 1. *P. filiformis*, Filiform Sparrow-wort; 2. *P. hirsuta*, Shaggy Sparrow-wort; 3. *P. capitata*, Headed Sparrow-wort; 4. *P. ciliata*, Ciliated Sparrow-wort; 5. *P. unifiora*, One-flowered Sparrow-wort.

The first rises with a shrubby stalk five or six feet high, sending out branches the whole length, which, when young, grow erect, but as they advance in length, they incline towards a horizontal position; but more so, when the small shoots at the end are full of flowers and seed-vessels: the branches are covered with a white down like meal, and are closely beset with very narrow leaves in four rows, so that the young branches seem as if they were four-cornered: the flowers come out at the extremity of the young branches, from between the leaves, on every side, are small and white, so that they make no great appearance. It is a native of the Cape, flowering from the month of June to August.

The second species has shrubby stalks, which rise to a greater height than the former: the branches grow more diffused, and are covered with a mealy down: the leaves imbricate, short, thick, succulent, smooth and green on the outside, but downy on the inner: the flowers small and white, like those of the former, appearing about the same time. It is a native of Spain and Portugal.

The third has the leaves scattered: the heads terminating, globular: the peduncles tomentose, thickened: the flowers many, white, sessile without a tube: the stamens above the throat sixteen, the eight inner of which are castrated: stems shrubby, compound, with rod-like red branches: the leaves erect, acuminate: the common peduncles from the end of the branches, turbinate, tomentose. It is a native of the Cape.

The fourth species has a shrubby stalk, rising five or six feet high, sending out many branches which are naked to their ends, where they have oblong leaves, standing erect, and having hairy points: the flowers are small, white, and come out among the leaves at the end of the branches: but according to Linnæus purple, with the throat villose. It is a native of the Cape, flowering here in June.

The fifth has a shrubby stalk, seldom rising more than a foot high, dividing into many branches, which are slender, smooth, and spread out on every side: the leaves dark-green, having the appearance of those of the fir-tree, but narrower: the flowers are larger than those of the former, and the upper part of the petals is spread open flat: they are of a purple colour, and appear about the same time as the former. It is a native of the Cape.

Culture.—All the sorts may be increased by cuttings planted in a bed of loamy earth, during the summer months, and closely covered with a bell or hand glass to exclude the air, shading them from the sun, and refreshing them now and then with water. When well rooted they may be planted out, each into a small pot filled with loamy earth; placing them in the shade

till they have taken new root; then be removed into a sheltered situation, to remain till the beginning of autumn, when they must be placed in the green-house, and treated as the myrtles. They may likewise be increased by layers.

The second sort may also be raised by sowing the seeds in autumn, soon after they are ripe, in small pots filled with light earth, plunging them into an old bark-bed under a common frame in winter: the plants rise in the spring, and must be treated like the cuttings. The seedling plants grow the most erect, and make the handsomest appearance.

This sort is capable of living abroad in common winters, in a dry soil and warm situation; but in hard frosts the plants are frequently destroyed: one or two should therefore be kept in pots, and sheltered during that season.

They afford variety among other potted green-house plants.

PASSIFLORA, a genus containing plants of the herbaceous and shrubby flowering kinds.

It belongs to the class and order *Gynandria Pentandria*, (*Pentandria Trigynia*,) (*Monadelphia Pentandria*,) and ranks in the natural order of *Cucurbitaceæ*.

The characters are: that the calyx is a five-parted perianthium, flat, coloured: the corolla has five petals, semilanceolate, flat, blunt, of the same size and form with the calyx: nectary a triple crown; the outer longer, encircling the style within the petals, more contracted above: the stamina have five awl-shaped filaments, fastened to a column at the base of the germ, and united at bottom, spreading: anthers incumbent, oblong, blunt: the pistillum is a roundish germ, placed on the apex of a straight, cylindrical column: styles three, thicker above, spreading: stigmas capitate: the pericarpium is a fleshy berry, subovate, one-celled, pedicelled: the seeds very many, ovate, arilled: receptacle of the seeds triple, growing longitudinally to the rind of the pericarp.

The species cultivated are: 1. *P. cærulea*, Common or Blue Passion-flower; 2. *P. incarnata*, Rose-coloured Passion-flower; 3. *P. lutea*, Yellow Passion-flower; 4. *P. serratifolia*, Notch-leaved Passion-flower; 5. *P. maliformis*, Apple-fruited Passion-flower; 6. *P. quadrangularis*, Square-stalked Passion-flower; 7. *P. alata*, Wing-stalked Passion-flower; 8. *P. laurifolia*, Laurel-leaved Passion-flower, or Water Lemon; 9. *P. multiflora*, Many-flowered Passion-flower; 10. *P. rubra*, Red-fruited Passion-flower: 11. *P. Murucuja*, Moon-shaped-leaved Passion-flower; 12. *P. Vespertilio*, Bat-winged Passion-flower; 13. *P. rotundifolia*, Round-leaved Passion-flower; 14. *P. ciliata*, Ciliated Passion-flower; 15. *P. suberosa*, Cork-barked Passion-flower; 16. *P. holosericea*, Silky-leaved Passion-flower; 17. *P. glauca*, Glaucous-leaved Passion-flower; 18. *P. minima*, Dwarf Passion-flower.

The first rises in a few years to a great height, with proper support: it may be trained up more than forty feet high: the stalks will grow almost as large as a man's arm, and are covered with a purplish bark, but do not become very woody: the shoots often grow to the length of twelve or fifteen feet in one summer, and being very slender, must be supported, otherwise they will hang to the ground, intermix with each other, and appear very unsightly: at each joint is one leaf composed of five smooth entire lobes; the middle one, which is longest, almost four inches long, and one inch broad in the middle; the others are gradually shorter, and the two outer lobes are frequently divided on their outer side into two smaller ones: their foot-stalks are near two inches long, and have two embracing stipules at their base; and from the same point issues a long clasper or tendril: the flowers come out at the same joint with the leaves, on peduncles almost three inches long; they are blue, have a faint scent, and continue only one day: the fruit is egg-shaped, the size and shape of the Mogul-plum, and when ripe of the same yellow colour. It grows naturally in Brazil.

There is a variety with much narrower lobes, divided almost to the bottom: the flowers come later in the summer: the petals are narrower, and of a purer white colour.

The second species has a perennial root: the stalks are annual, slender, rising four or five feet high: at each joint one leaf, on a short foot-stalk, having mostly three oblong lobes, but the two side ones are sometimes divided part of their length into two narrow segments, and thus becoming five-lobed; they are thin, of a light green, and slightly serrate: the flowers are produced from the joints of the stalk, at the foot-stalks of the leaves, on long slender peduncles, in succession as the stalks advance in height during the summer months: they have an agreeable scent, but are of short duration, opening in the morning, and fading away in the evening: the fruit is as large as a middling apple, changing to a pale orange colour when ripe. It grows naturally in Virginia.

The third has a creeping root, sending up many weak stalks, three or four feet high: the leaves are shaped like those of ivy, and almost as large, but of a pale green and very thin consistence: the peduncle is slender, an inch and half long: the flowers dirty yellow, not larger than a sixpence when expanded. It is

a native of Virginia and Jamaica, flowering in May and June.

The fourth species is perennial and shrubby: the stems are round; the younger ones very slightly villose, and climbing very high: the stipules are linear and acuminate: the footstalks of the leaves furnished with two pairs of glandules: the leaves ovate, smooth, and slightly serrated round their whole outline: the peduncles are one-flowered and solitary: the flowers have an extremely agreeable odour. It is a native of the West Indies, flowering from May to October.

The fifth has a thick stem, triangular, by slender tendrils thrown out at every joint rising to the height of fifteen or twenty feet: at each joint is one leaf, six inches long, and four broad in the middle, of a lively green and thin texture, having a strong midrib, whence arise several small nerves, diverging to the sides, and curving up towards the top: petioles pretty long, having two small glands in the middle: two large stipules encompass the petioles, peduncles and tendrils at the base: the peduncles are pretty long, having also two small glands in the middle: the cover of the flower is composed of three soft velvety leaves, of a pale red, with some stripes of a lively red colour; the petals are white, and the rays blue: the flowers being large make a fine appearance, but are of short duration; there is however a succession for some time: the fruit is roundish, the size of a large apple, yellow when ripe, having a thicker rind than any of the other sorts. It grows naturally in the West Indies.

In the sixth the stem is almost simple, thick, membranaceous at the four corners, somewhat hispid: the leaves are petioled, five or six inches long, entire, somewhat rugged, but without any pubescence: the tendrils very long, axillary: stipules in pairs, ovate at the base of the petioles, on which are six glands: the peduncles opposite to the petioles, thicker: the flowers very large, encompassed by a three-leaved involucre, the leaves of which are roundish, concave, entire, smooth, pale: the fruit is very large, oblong, and fleshy: the flower is much larger, though very like the above sort in colour. It is a native of Jamaica.

The seventh species is very like the preceding at first sight: the open flower has also a general resemblance; but the peduncle is cylindrical; the three divisions of the involucre small, lanceolate, with glandular serratures; the pedicel thickest at the insertion into the convex base of the flower: the five or six outer petals are oblong with an awn, the inner longer; the outer principal rays thinnest and shortest; imperfect rays in a double row, below and distinct from them a single row: no imperfect operculum; operculum partly horizontal and partly turning up to the column, then folding back down again and embracing the column, with which it is so connected that it appears inseparable, but is not joined to the column: nectary round the column, confined by the base: the column comes to the bottom of it. It is a native of the West Indies.

If this does not equal the first sort in elegance, it exceeds it in magnificence, in brilliancy of colour, and in fragrance, the flowers being highly odoriferous.

The eighth has a suffrutescent stem, with very divaricating, filiform branches: the leaves a little emarginate at the base, nerved, and very smooth, on short petioles compressed a little, having two glands under the base of the leaf: the tendrils are very long: the peduncles the length of the petioles: the three leaflets of the involucre are roundish, concave, with blunt glandular toothlets about the edge, and pale: the five leaflets of the calyx are broad-lanceolate, slightly membranaceous at the edge, horned with a point or awn, smooth, variegated on the inside with blood-red dots: petals five, the length of the calyx, narrower, acuminate, with blood-red dots scattered over them: the flowers are very handsome and odoriferous, but the fruit ovate and watery. It flowers in June and July, and is a native of Jamaica.

The ninth species has slender stalks, sending out many small branches, and climbing to the height of twenty-five or thirty feet: by age they become woody towards the bottom, and their joints are not far asunder: the leaves are on short slender petioles, three inches and a half long, and two broad in the middle, rounded at the base, but terminating in a point at top, smooth, entire, and of a lively green colour: the flowers are axillary, on long peduncles, having an agreeable odour, but seldom continuing twenty hours open. There is a succession of them from June to September, and the fruit will sometimes ripen in this climate. It grows naturally at La Vera Cruz.

The tenth has an herbaceous stem, twining round, grooved, hirsute, red: the lobes of the leaves entire, nerved, somewhat hispid, soft: the petioles round, red, villose, without glands: the tendrils subaxillary: the flowers alternate, nodding, on solitary one-flowered peduncles: the fruit spherical, marked with six lines, scarlet when ripe, hirsute. It is a native of the West Indies, flowering in April and May.

The eleventh species has an herbaceous, grooved, smooth stem: the leaves ovate or oblong, two-horned, with an intermediate bristle, three-nerved, veined, smooth, entire: dots on the back hollowed, pellucid: the petioles grooved, smooth, destitute of glands: the tendrils sub-

axillary, filiform, long: the flowers in pairs, axillary, scarlet, large: the berry ovate, the size of a pigeon's egg, and pedicelled. It is a native of the West Indies.

The twelfth has slender, striated, roundish stalks, less than a straw, of the same thickness from top to bottom, and of a brownish red colour, dividing into many slender branches: the leaves shaped like the wings of a bat when extended, about seven inches in length, or rather breadth, from the base to the top not more than two inches and a half, the upper ones smaller, the middle wider, and the lower narrower, smooth and somewhat shining; the colour in the upper ones pale, in the middle deeper, in the lower darker green, with two purple tubercles or glands towards the base, where they are connected with the petiole; which is set half an inch from the base of the leaf, three nerves springing from it, two extending each way to the narrow points of the leaf, the other rising upright to the top, where is the greatest length of the leaf: the flowers are on short round peduncles from the axils of the middle and upper leaves, white and of a middle size, about three inches in diameter when expanded: they are without scent, open in the evening or during the night, in the month of July, and finally close about eight or nine o'clock in the morning. It is a native of the West Indies.

The thirteenth species has the stem suffrutescent at bottom, subdivided, angular, grooved: the leaves semiovate, three-nerved, veined, smooth on both sides, marked behind longitudinally with pellucid dots: lobes terminated by very small bristles; the middle one a little larger than the others: the petioles short, without glands: the tendrils filiform, very long: the stipules two, opposite, awl-shaped: the peduncles axillary, filiform, an inch long: the flowers nodding, pale green, rather large: the berry egg-shaped. It is distinguished from the other sorts by its rounded leaves slightly three-lobed at top only. It is a native of Jamaica.

The fourteenth runs to a great height, and has dark-green glossy leaves: the involucrum is composed of three leaves divided into capillary segments, each terminating in a viscid globule: the pillar supporting the germen is bright purple with darker spots: the petals are greenish on the outside, and red within: the crown consists of four rows of radii, which are varied with white and purple. It is a native of Jamaica.

The fifteenth species rises with a weak stalk to the height of twenty feet: as the stalks grow old, they have a thick fungous bark like that of the Cork-tree, which cracks and splits: the smaller branches are covered with a smooth bark: the leaves are smooth, on very short petioles: the middle lobe is much longer than the lateral ones, so that the whole leaf is halbert-shaped: the flowers are small, of a greenish yellow colour: the fruit egg-shaped, dark purple when ripe. It is perennial, and a native of the West Indies, flowering from June to September.

In the sixteenth species the stalks rise twenty feet high, dividing into many slender branches, covered with a soft hairy down: the leaves are shaped like the point of a halbert, three inches long, and an inch and half wide at the base, light green, soft and silky to the touch, standing obliquely to the foot-stalks: the flowers are not half so large as those of the common or blue Passion-flower: the fruit small, roundish, yellow when ripe, leaves ovate, tomentose on both sides: lateral lobes short; with an obsolete gland underneath behind the sinus of the lobe. It grows naturally at La Vera Cruz, flowering most part of the summer.

In the seventeenth, the whole plant is very smooth and even: the leaves glaucous underneath, undotted: the petioles furnished with two or four glands below the middle: the stipules acute, quite entire, more than half an inch in length: the flowers are sweet. It is a native of Cayenne.

The eighteenth species has the stem twining, simple, becoming corky at the base with age, round, smooth: the leaves subpeltate, subcordate: lateral lobes almost horizontal; all acute, nerved, smooth on both sides: the petioles short, round, reflex, smooth: the glands two, opposite, small, sessile, concave, brown, in the middle of the petioles: the stipules two, opposite, awl-shaped, by the side of the petioles: the tendrils long, between the petioles: peduncles axillary, solitary, longer than the petioles, loose, one-flowered: the flowers small, whitish: the berry small, blue, egg-shaped.

Culture.—In all the sorts it is either by seeds, layers, or cuttings, according to the kinds.

The first or hardy sort is capable of being raised either by seeds, layers, or cuttings: the seed should be sown in the early spring, as March, in large pots, half an inch deep, either plunging them in a warm border, and as the weather becomes warm moving them to the shade; or in a hot-bed, which will forward the germination of the seed more fully, and the plants will rise sooner; which should afterwards be hardened gradually to the open air till the autumn, and then placed under a garden-frame for the winter, to have shelter from frosts, and in the spring planted out in pots, or some in the nursery; and in a year or two they may be transplanted where they are to remain, against some warm south wall.

The layers should be laid down from some of the branches in the common way in the spring, when they will readily emit roots, and make proper plants by autumn; when, or rather in spring following, they should be taken off and transplanted either into pots in nursery rows, or where they are to remain.

The cuttings should be made in February or March from the strong young shoots, in length from about eight to ten or twelve inches, planting them in any bed or border of common earth, giving frequent watering in dry weather, and when sunny and hot, if in a situation exposed to them, a moderate shade of mats will be of much advantage. They will emit roots at bottom, and shoots at top, and become good plants by autumn, allowing them the occasional shelter of mats, &c. during the winter's frost; and in the spring let them be planted out. If a quantity of these cuttings be planted close, and covered down with hand-glasses, it will forward their rooting; observing, however, when they begin to shoot at top, to remove the glasses, in order to admit fresh air.

The second and third, or green-house kinds, may be increased by seed, layers, and parting the roots: the seed, obtained from America, should be sown in pots in March or April, plunging them in a hot-bed to raise the plants, which afterwards inure to the open air in summer, giving them the shelter of a green-house or frame in winter; and in the spring following plant some out in pots, placing them among the green-house plants; and others may be planted in the full ground, under a warm fence, to take their chance.

The layers should be made in the summer from young shoots, which will readily grow, and become good plants for potting off in autumn. The parting the roots should be done in spring, before they begin to shoot. The second sort multiplies exceedingly by its creeping roots; which should be divided into slips, and planted in a bed of rich earth till autumn, when some should be transplanted into pots for occasional shelter in winter.

All the other more tender stove kinds are capable of being increased by seeds, layers, and cuttings: The seeds are procured chiefly from abroad; and should be sown in spring in pots, plunging them in a hot-bed, or in a stove bark-bed: the plants soon appear, which, when three inches high, should be pricked out in separate small pots, giving water, and re-plunging them in the hot-bed, occasionally shading them till rooted: as they advance in growth, they should be shifted into larger pots, and be retained constantly in the stove.

The layers should be made from the young branches in the spring or beginning of summer, which will readily grow, and be fit to pot off separately in autumn.

The cuttings should be made in the spring or summer, from the young shoots, planting them in pots, plunging them in the bark-bed, and giving water frequently; when most of them will take root, and be fit to pot off singly in autumn.

In respect to their general culture; as in severe winters, in the first sort, the branches, if not duly protected, are sometimes killed, it is advisable at such times, whilst the plants are young in particular, to give them the shelter of mats during the inclement season, and protect their roots with dry litter laid over the ground; carefully uncovering their branches as soon as the frost breaks: this covering, however, is only necessary in very severe frosts.

The green-house sorts should generally be potted, to move to shelter in winter, either of a green-house, or deep garden-frame: some plants of each sort may also be planted in the full ground, in a warm border, to take their chance; covering the ground over their roots in severe weather; and in the different orders of planting, placing stakes for the support of their climbing growth in the summer. And all the stove kinds must constantly be kept in pots, placed in the stove, and for the most part plunged in the bark-bed; placing strong stakes for the purpose of training the branches to, and managing them as other stove-plants of a similar growth. See STOVE-PLANTS.

The first sort is highly ornamental in the open ground when trained against southern walls, &c.; and those of the green-house, and stove kinds, among other plants in these collections.

PASTINACA, a genus containing plants of the herbaceous esculent kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ* or *Umbelliferæ*.

The characters are: that the calyx is an universal umbel, manifold, flat: partial manifold: involucre universal none: partial none: perianthium proper obsolete: the corolla universal uniform: florets all fertile: proper of five lanceolate involute entire petals: the stamina have five capillary filaments: anthers roundish: the pistillum is an inferior germ: styles two, reflex: stigmas blunt: there is no pericarpium: fruit compressed flat, elliptic, bipartite: the seeds two, elliptic, girt round the edge, almost flat on both sides.

The species cultivated are: 1. *P. sativa*. Common Parsnep; 2. *P. Opopanax*, Rough Parsnep.

In the first, in the wild plant, the root is biennial, simple, whitish, putting forth some large fibres from the side: the stem single, three or four feet high, erect, rigid, angular, pubescent, hollow, branched: the leaves alternate, smaller than those of the cultivated kind, and of a darker green; in open situations pubescent, especially the root-leaves: the flowering-branches come out from the axils of the leaves from top to bottom, supporting umbels which are smaller than that which terminates the stem: the flowers small, yellow, with inflex regular petals.

It is a native of most parts of Europe; but the garden or cultivated variety has smooth leaves, of a light or yellowish green colour, in which it differs from the wild plant: the stalks also rise higher, and are deeper channelled: the peduncles are much longer, and the flowers of a deeper yellow colour: the roots are sweeter than those of carrots, and are much eaten by those who abstain from animal food in Lent, or eat salt-fish; and are highly nutritious. Hogs are fond of these roots, and cattle will eat them.

The second species has a perennial root, as thick as the human arm, yellow, branched: the branches an inch or an inch and half in thickness, a foot and half in length, tubercled, with a corky bark: the stem from three feet to the height of a man, the thickness of a finger, striated, covered at the base with scariose membranaceous scales, like the Ferns; in other parts very smooth and shining; angular at top, especially at the branches. Primary (or root) leaves quite simple, cordate, acutely crenate: the others ternate or quinate, with the end leaflet always cordate and very large; the lateral ones obliquely cordate, with the upper lobe shorter: the lowest stem-leaves more compound, considered as a whole triangular, two feet long, bipinnate, having five pinnules on each side; the lowest pinna pinnate, commonly with five leaflets, the end one cordate, the rest sessile and obliquely cordate: the leaflets are an inch to two inches long; the other pinnules are first ternate, then simple. The other stem-leaves decrease, and are first quinate, next ternate, and at the branches simple. Petiole of the root-leaves from the sheath to the first pinna flattish above and thence angular-keeled; on the contrary, that of the branch-leaves is furrowed. Sheaths wide striated, in the root-leaves very strigose: in the stem-leaves smooth. All the leaflets are hairy, especially at the back. At the flowering-branches there are spathaceous sheaths, which are naked, or destitute of leaves. The umbelliferous branches are very smooth; first alternate, erect, then two, three, or four together in a sort of whorl, two or three inches long, with one or two spathaceous leaflets towards the middle, or at the top. The universal umbels have usually seven or eight rays, an inch long, of a yellowish green colour: the fruits flat, with the rim thicker, three or four lines in diameter, and a little longer: the juice is yellow, bearing no marks of a resinous or aromatic principle. It flows out where either the leaf or stalk is broken. They are both very rough; the former dark green, the latter seven or eight feet high: the stalks divide towards the top into many horizontal branches, each terminated by a large umbel of yellow flowers; which appear in July. It is a native of the south of Europe.

It commonly ripens its seeds in this climate, and its juice manifests some of the qualities discovered in the officinal Opopanax: but it is only in the warmer regions of the East, where this plant is also a native, that the juice concretes into this gum-resin. It is obtained by means of incisions made at the bottom of the stalk.

Culture.—In the first sort it is easily effected by sowing fresh seed in the latter end of February, or beginning of the following month, upon a bed prepared in a spot of the best light, rich, deep soil, in one of the most open airy quarters of the garden, by being trenched one full spade deep at least, or if two the better, provided the depth of good staple admit, that the roots may have a due depth of loose soil to run down straight to their full length. And if the ground be previously trenched up in rough ridges in winter, especially where stiff or wet, and lie exposed some time to the sun and air, it will be much improved for this purpose. At the time of sowing, the ground should be made level and even on the surface, but not raked till after the seed is sown, which should be performed while the ground is fresh stirred, or before the surface becomes too dry, so as, in raking, the clods will readily fall under the rake to bury the seed regularly.

The seed should be sown broad-cast thinly, either all over the surface, or the ground may be divided into four-feet-wide beds, as most convenient, but for large quantities the former is the most eligible practice. As soon as the sowing is done, if light ground, it is the practice with some to tread down the seeds evenly, and finish with an even good raking, to cover all the seeds equally, smoothing the surface. In about three weeks the seeds begin to germinate, and the plants soon appear above ground. When they are two or three inches high, they should be thinned to regular distances, and cleaned

from weeds; which may be done either by hand or small-hoeing; but the latter is preferable for the benefit of the crop, and considerably the most expeditious: it should generally be performed by a three- or four-inch hoe. Dry weather should be chosen for the purpose, and the plants cut out to about ten or twelve inches distance, as they should have large room, cutting up all weeds as the work proceeds. After this, no more culture is required till the future progress of the weeds renders another hoeing necessary; and probably another repetition may also be required, till the plants are in full leaf, when they cover the ground, and bid defiance to any further interruption from weeds.

In the autumn, about October, the roots will be arrived nearly at their full growth; when the leaves begin to turn yellow and decay, which is a certain sign of their maturity: they may then be dug up for use, as they are wanted.

These roots may either remain in the ground all winter, and be taken up as wanted, or a quantity may be dug up in autumn, and their tops pared off close, and then buried all winter in sand, in a shed or other dry place, to be ready at all times for use: some should also be left in the ground for spring service, as January or the beginning of February, digging them up just before they begin to shoot, and laying them in the sand; as by taking them up at this time, it retards their effort for shooting, so as that they continue in tolerable perfection until the latter end of April or longer.

In order to have parsneps in due perfection, great care is necessary to save seed only from some of the finest rooted plants; for which purpose, a quantity of the large, long, straight roots should be selected, trimming off their leaves, and planting them in rows three feet asunder, and two distant in the lines, about an inch deep over their top; in which method they will shoot up strong in spring for flowering, and ripen seed in the latter end of August, or early in September; when in a dry day, the umbels of seed should be cut off and spread upon mats to dry and harden, afterwards thrashing out the seeds, and putting them up in bags for use.

The second sort may be raised, by sowing the seed in the places where the plants are to remain, at the same season as the above; keeping the plants afterwards properly thinned and clear from weeds.

The first is an useful esculent root, that contains a large proportion of nutritious matter; but the latter is chiefly cultivated for affording variety in the borders or other parts of pleasure-grounds.

PEA. See Pisum.

PEA, EVERLASTING. See Lathyrus.
PEA, HEART. See Cardiospermum.
PEA, PIGEON. See Cytisus.
PEA, SWEET. See Lathyrus.
PEA, WING. See Lotus.
PEACH TREE. See Amygdalus.
PEAR TREE. See Pyrus.

PELARGONIUM, a genus containing plants of the fine shrubby under-shrubby evergreen and herbaceous perennial kinds for the greenhouse.

It belongs to the class and order *Monadelphia Heptandria*, and ranks in the natural order of *Gruinales*.

The characters are: that the calyx is a one-leafed perianthium, five-parted; segments ovate, acute, concave, permanent, upper segment ending in a capillary nectariferous tube, decurrent along the peduncle: the corolla has five petals, obcordate or ovate, spreading, large, irregular: the stamina have ten awl-shaped filaments, united at the base, spreading at top, unequal in length, all shorter than the corolla, three of them (seldom five) castrated: anthers seven, oblong, versatile: the pistillum is a five-cornered germ, beaked: style awl-shaped, longer than the stamens, permanent: stigmas five, reflex: the pericarpium is a five-grained capsule, beaked, the cells opening inwards: the beak spiral, bearded on the inside: the seeds solitary, ovate-oblong.

The species cultivated are: 1. *P. alchemilloides*, Lady's-mantle-leaved Crane's-bill; 2. *P. odoratissimum*, Sweet-scented Crane's-bill; 3. *P. grossularioides*, Gooseberry-leaved Crane's-bill; 4. *P. coriandrifolium*, Coriander-leaved Crane's-bill; 5. *P. carnosum*, Fleshy-stalked Crane's-bill; 6. *P. ceratophyllum*, Horn-leaved Crane's-bill; 7. *P. gibbosum*, Gouty Crane's-bill; 8. *P. radula*, Multifid leaved Crane's-bill; 9. *P. papilionaceum*, Butterfly Crane's-bill; 10. *P. inquinans*, Scarlet-flowered Crane's-bill; 11. *P. zonale*, Common Horse-shoe Crane's-bill; 12. *P. bicolor*, Two-coloured Crane's-bill; 13. *P. vitifolium*, Balm-scented Crane's-bill; 14. *P. capitatum*, Rose-scented Crane's-bill; 15. *P. glutinosum*, Clammy Crane's-bill; 16. *P. cucullatum*, Hooded Crane's-bill; 17. *P. cordatum*, Heart-leaved Crane's-bill; 18. *P. echinatum*, Prickly-stalked Crane's-bill; 19. *P. tetragonum*, Square-stalked Crane's-bill; 20. *P. betulinum*, Birch-leaved Crane's-bill; 21. *P. glaucum*, Spear-leaved Crane's-bill; 22. *P. acetosum*, Sorrel Crane's-bill; 23. *P. scabrum*, Rough-leaved Crane's-bill; 24. *P. ternatum*, Ternate Crane's-bill; 25. *P. tricolor*, Three-coloured Crane's-bill.

The first sends out several herbaceous stalks about a foot and half in length. The flowers are

pale blush-colour, several together upon very long peduncles: and there is a succession of them during all the summer months.

There is a variety with a dark circle in the middle of the leaves.

The second species has a very short fleshy stalk, dividing near the ground into several heads, each having many leaves, on separate footstalks from the heads; they are soft and downy, and have a strong scent like aniseed. From these heads come out several slender stalks, near a foot in length, prostrate, with rounder leaves than those near the root, but of the same texture and odour: the flowers are produced from the side of these stalks, three, four, or five standing together upon slender peduncles; they are white, but being small they make little appearance.

The third has the stem prostrate, four-cornered, smooth; as is also the whole plant, which is biennial, sending out a great number of very slender trailing stalks, extending a foot and half in length: the leaves are small, marked with lines: the peduncles are capillary, with two or three small flowers, of a pale flesh-colour. They continue in succession all the summer.

The fourth species is an annual or rather biennial plant, with branching stalks near a foot high: the lower leaves stand upon long footstalks, but those on the upper part sit close to the stalks: the flowers stand upon naked peduncles, which proceed from the side of the stalks, on the side opposite to the leaves: they grow three or four together upon short separate pedicels: they are of a pale flesh-colour, and appear in July.

The fifth has a thick fleshy knotted stalk, rising about two feet high, sending out a few slender fleshy branches, thinly set with leaves, which on the lower part of the stalk are petioled, but above sessile: the flowers are produced in small clusters at the ends of the branches: the petals are narrow and white, making no great appearance; they continue in succession most part of the summer.

The sixth species flowers in May, and continues to do so during most of the summer months: the seeds ripen in this climate. It is a native of the South-west coast of Africa.

The seventh has a round fleshy stalk with swelling knots at the joints, rising about three feet high, and sending out several irregular smooth branches: the leaves are thinly disposed, smooth, fleshy, gray, ending obtusely, and standing on short footstalks: the flowers four or five on a peduncle: the petals dark-purple, having a very agreeable scent in the evening: it flowers most part of the summer.

The eighth species has a shrubby stem, covered with an ash-coloured bark, branched, two feet high: the leaves are numerous, alternate, nearly equal to the petioles, very deeply five-cleft: the segments pinnate and bipinnate, linear: stipules wide, acuminate and shrivelling: the peduncles axillary, solitary, with one, two, or three flowers: involucre generally five-cleft, shrivelling. The whole plant has a strong smell of turpentine. The leaves in the young plants are often three inches long; but in old ones only one third of the size, and more numerous. It has the name *Radula*, from the rough rasp-like surface of its leaves. It flowers from March to July.

There are two varieties, a larger and a smaller: and as it is readily raised from seeds, it affords many seminal varieties.

The ninth rises with an upright shrubby stalk seven or eight feet high, sending out several side branches with large, angular, rough leaves, on short footstalks: the flowers are produced in large panicles (umbels) at the ends of the branches: the two upper petals, which are pretty large, turn upwards, and are finely variegated; but the three under ones are very small, and, being bent back, are screened from sight, unless the flower be viewed near. It flowers from April to July.

The tenth species rises with a soft shrubby stem to the height of eight or ten feet, sending out several branches, which are generally erect: the leaves of a thick substance, and a lucid green, on pretty long footstalks, covered with soft hairs on their under side: the flowers are in loose bunches (umbels), on long, stiff, axillary peduncles: the corolla bright scarlet: the flowers make a fine appearance, and there is a succession of them during all the summer months.

The eleventh rises with a shrubby stalk four or five feet high, and divides into a great number of irregular branches, so as to form a large bush, frequently eight or ten feet in height: the leaves are indented on the edge in several obtuse segments, cut into short teeth; there is a purplish curved zone in form of a horse-shoe, from one side of the base to the other, corresponding with the border; and when gently rubbed, the leaves have a scent like scalded apples: the flowers are produced in pretty close bunches, on axillary peduncles, five or six inches in length, coming out towards the ends of the branches; they are of a reddish purple colour, and continue in succession great part of the summer.

There is a variety with fine variegated leaves, and the flowers vary much in colour from

purple, through the different shades of red to high scarlet.

The twelfth species has the stem shrubby, twisted, covered with an ash-coloured bark: the branches round, villose, sub-herbaceous, a foot long: the leaves opposite, on long petioles, glaucous, rugged; lobes curled, toothed: the stipules almost embracing, acuminate: the common peduncle often opposite to a leaf, or lateral, sometimes axillary, longer than the leaf: involucre one-leafed, many-parted, shrivelling; rays about thirteen, scarcely an inch long. It is remarked by Jacquin, that the whole has a very strong smell: and Curtis says that it obviously differs from all the other species in the particular shape of its leaves, and the colour of the flowers, which are usually of a rich and very dark purple edged with white. It flowers from June to August.

The thirteenth species rises with an upright shrubby stalk to the height of seven or eight feet, sending out many pretty strong branches: the leaves are somewhat like those of the vine; the lower on long petioles, the upper on short ones; when rubbed, they have a scent of balm: the flowers grow in compact clusters, on the top of long, naked, axillary peduncles, rising much higher than the branches; being small and of a pale blue colour, making no great figure; but containing a succession for most part of the summer.

The fourteenth rises with a shrubby stalk four or five feet high, dividing into several weak irregular branches: the leaves are divided into three unequal lobes, which are hairy, and waved on their edges; they are placed alternately, and their footstalks are hairy: the flowers grow in close roundish heads, forming a sort of corymb; are of a purplish blue colour, and continue in succession a great part of the summer: the leaves, when rubbed, have the odour of dried roses.

The fifteenth species has a shrubby stem, covered with a gray bark, three feet high and more; branches declining and decumbent, green, clammy, as is the whole plant: the leaves are alternate, the uppermost sometimes opposite, often shorter than the petioles, large, acute, sinuate: the stipules wide-acuminate, shrivelling: the common peduncles axillary, lateral, or opposite to a leaf, erect, solitary, longer than the leaves: involucre five-leaved, the leaflets ovate-acute, shrivelling: rays from three to eight, half an inch long: the middle of the leaf is generally stained with purple. It flowers in May and June, continuing to September.

Several varieties have been produced from seed.

The sixteenth rises with a shrubby stalk eight or ten feet high, sending out several irregular branches: the leaves are roundish, with the sides erect, so as to form a hollow or hood, whence termed cowled; are heart-shaped at the base, or kidney-shaped, and from the footstalk run many nerves arising from a point, but diverging towards the sides; the borders are sharply indented; those on the lower part of the branches have long footstalks, and are placed without order on every side, but those on the upper part have shorter footstalks, and stand opposite: the flowers are produced in large panicles (or umbels) on the tops of the branches, of a purple blue colour. It flowers from June to September.

The seventeenth species has a shrubby branched stem, when young red, when very young green and villose, when old covered with an ash-coloured bark: the leaves are alternate, almost equal to the petioles, tomentose, whitish underneath: the stipules subovate: the flowers at the ends of the stem and branches in numerous umbels. It flowers from March to July.

There are several varieties.

The eighteenth has the stalk green, surface smooth and somewhat glossy, beset with spines which bend back and terminate in brownish weakish points; these appear to have been primarily the stipules, which become thus fleshy and rigid: the leaves are on long footstalks, veiny, soft and downy, especially on the under side, which is of a much lighter colour than the upper: the flowering stem proceeds from the summit of the stalk, and is a foot or more in height: as it advances it throws out its branches or peduncles, ultimately about five in number, each of which has a leaf at its base, similar to the other leaves of the plant, but smaller, and terminates in an umbel of seven or eight flowers of a spotted purple colour. In its habit it somewhat resembles the preceding. It flowers from May to September.

It varies with petals of a rich purple colour, in which the spots are similar, but not so conspicuous.

The nineteenth species has angular stems, angles four, sometimes three, succulent, as is the whole plant, procumbent when they shoot out into length, at first hairy, afterwards very smooth, much branched, and three feet high: the leaves alternate, almost equal to the petioles, orbiculate, five-lobed; the younger villose, tooth-crenate, violate-coloured underneath, and above having a dark red zone; the older crenate, fleshy, dark green, with a few villose hairs, and frequently with a zone: the stipules short, semicircular, spreading, shrivelling: the pe-

duncles axillary, erect, rugged; with four subovate stipules at the forks. Mr. Curtis observes that a vein of singularity runs through the whole of this plant: its stalks are unequally and obtusely quadrangular, sometimes more evidently triangular: its leaves few and remarkably small: its flowers, on the contrary, are uncommonly large, and, what is more extraordinary, have only four petals; previous to their expansion the body of filaments is bent so as to form a kind of bow.

There is a variety with beautifully coloured leaves.

The twentieth has a shrubby stem, four or five feet high, sending out several branches: the peduncles long, coming out from the side of the branches: the flowers vary considerably both in size and colour: its foliage is different from that of the other sorts, and, as its name imports, like that of the birch-tree. It flowers most part of the summer.

In the twenty-first, the whole plant is very smooth, glaucous, and in a manner whitish: the stem shrubby, with round, rod-like, declining branches, two feet high: the leaves opposite, often shorter than the petioles, which are round and erect: the stipules lanceolate-acuminate, fleshy, deciduous: the peduncles alternately axillary, very long, one- or two-flowered. It flowers from June to August.

The twenty-second species has a shrubby stem, six or seven feet high, sending out several side branches: the leaves of a gray colour, and having an acid taste like sorrel: the peduncles axillary, long, sustaining three or four flowers, with narrow unequal petals, of a pale blush-colour, with some stripes of a light red: the flowers continue in succession most part of the summer.

There is a variety with scarlet flowers raised from seed.

The twenty-third has a shrubby stem, round, three or four feet high, the thickness of a finger, upright, of a reddish bay colour, branching from the axils, very rough, as is the whole plant, but becoming smooth with age: the leaves on long petioles, very widely wedge-shaped, three-nerved, acute, stiffish, alternate, except the upper ones next the flowers, which are opposite, the lower ones seven or eight inches in length reckoning the petioles; the lobes gashed or thinly toothed, but sometimes quite entire: the stipules small, ovate-acuminate, on each side next the petioles: the common peduncles terminating and axillary, short, sustaining commonly from four to six flowers, of a purple rose-colour, with dark blood-red spots. It flowers from August to November.

The twenty-fourth has a suffruticose stem, dichotomous, round, purple, villose, erect, two feet high and more: branches simple, short, resembling the stem: the leaves rigid, strigose-rugged, an inch long: serratures purplish: the petioles villose, the length of the leaves: the stipules two or more, ovate-acute, concave, a line in length: the flowers lateral and terminating, umbelled: involucres lanceolate, purple, subciliate. It differs materially from the other sorts in the unusual roughness of the stalks, as well as in its whole habit.

The twenty-fifth species, which is but newly introduced, scarcely exceeds a foot in height, growing up with a shrubby stem, and spreading widely into numerous flowering branches, so much disposed to produce flowers in a constant succession, that during most of the summer the plant is loaded with a profusion of them. For the most part they go off without seed; and when any is produced, there is generally one perfect and four abortive. The whole plant is covered with short white hairs, which give to the foliage a somewhat silvery hue. The two uppermost petals are of a beautiful scarlet, having their bases nearly black; the three lowermost are white.

Most of the above species are natives of the Cape.

There are also many other species that may be cultivated.

Culture.—All the sorts may be increased by seeds, which should be sown in the early spring in pots filled with kitchen garden mould, plunging them in a moderate hot-bed. The plants soon appear; when they should have fresh air as much as possible, to prevent their being drawn up weak. When the plants have attained some growth, they should be removed into separate small pots filled with the same sort of earth, replunging them in the hot-bed till fresh rooted, and giving proper shade. They should afterwards be gradually inured to the open air, in order to be placed out in it in the summer season in a sheltered situation.

They may also be raised in the open ground without the hot-bed, but not so well.

But they are more commonly increased, especially the shrubby sorts, by cuttings of the young branches, which should be planted in a shady border in the summer, or in pots, and plunged in any hot-bed; which is the better method. When well rooted they may be taken up, and planted into separate pots, placing them in the shade till they have taken new root; after which they may be removed into a sheltered situation, and be treated in the same manner as the seedling plants. The fifth, seventh, and fifteenth sorts have more succulent stalks than the others: the

cuttings should therefore be planted in pots filled with the same sort of earth, and plunged into a very moderate hot-bed, where they may be shaded from the sun in the heat of the day, and have but little water; for these are very apt to rot with much moisture. When these are well rooted, they may be removed, and planted in separate pots filled with the same sort of earth, and placed in the shade till they have taken new root; then they may be removed into a sheltered situation, where they may remain till autumn. These sorts should be sparingly watered, especially in the winter season, as they are apt to take a mouldiness with moisture, or in a damp air. They thrive much better in an airy glass-case than in a green-house, as in the former they have more sun and air than in the latter. But all the other shrubby sorts are proper for the green-house, where they only require protection from frost, but should have a large share of free air when the weather is mild. They require water every week, in mild weather once or twice; but it should not be given them in too great plenty, especially in frosty weather. These plants should be hardened in the spring gradually, and towards the middle or end of May be taken out of the green-house, and at first placed under the shelter of trees, where they may remain a fortnight or three weeks to harden; and then be removed into a situation where they may be defended from strong winds, and enjoy the morning sun till eleven o'clock, where they will thrive better than in a warmer situation. And as these sorts grow pretty fast, they soon fill the pots with their roots; and when they stand long unremoved in summer, they frequently put out their roots through the holes at the bottom of the pots into the ground, when the plants grow vigorously; but if suffered to continue long in this manner, it is difficult to remove them; as, if their roots be torn off, all the younger branches decay, and the plants are frequently killed. The pots should therefore be moved once in a fortnight or three weeks, in the summer months, and the roots which may be then pushing through the holes cut off, to prevent their striking into the ground.

They require also to be new potted at least twice in the summer; the first time after they have been three weeks or a month out of the green-house; the second towards the end of August, or the beginning of September, that the plants may have time to establish their new roots before they are removed into the green-house. When this is performed, all the roots on the outside of the balls of earth should be carefully pared off, and as much of the old earth drawn away from the roots, as can be done with safety to the plants; then, where they require it, they should be put into pots a size larger than those out of which they were taken, putting a quantity of fresh earth into the bottom of each pot, placing the plants upon it, being careful that the ball about the roots of the plant be not so high as the rim of the pot, that some room may be left to contain the water which may be given to them. Then the cavity all round the ball should be filled up with fresh earth, be gently pressed down, and the bottom of the pot beaten upon the ground, to settle the earth; the plant being then well watered, and the stem fastened so as to prevent the wind from displacing the roots before they are fixed in the new earth.

Where such mould as has been mentioned cannot be procured, fresh hazel loam from a pasture, mixed with a fourth or a fifth part of rotten dung; or, where the earth is inclinable to bind, a mixture of rotten tan; and, where light and warm, a mixture of neat's-dung may be employed. This compost should be mixed three or four months before it is used, and be turned over three or four times, that the parts may be well incorporated.

The shrubby sorts require to be looked over frequently during the winter, while they are in the green-house, to pick off all decayed leaves from them, which if left on will not only render the plants unsightly, but by their falling off make a litter among the other plants; and if they are suffered to rot in the house, they occasion a foul, nasty, damp air, which is very prejudicial to all the plants.

The first sort from having herbaceous stalks is best increased by seeds, though cuttings of it will take root.

And the second sort may not only be propagated by seeds, but also from heads slipped off from the short fleshy stalk; which should have their lower leaves stripped off, and be then planted single in a small pot; or where the heads are small, two or three may be put into one pot; plunging them into a very moderate hot-bed, shading and refreshing them gently with water. They take root in a month or five weeks; when they should be hardened gradually to the open air, where they may remain till autumn, when they must be removed into shelter, as in the other kinds.

The sixth kind is capable of being increased both by seeds and cuttings, but is found to be more tender than many other sorts, and more liable to be injured by damps. The eighth species is readily increased by cuttings; but the twelfth is more difficultly raised in this way. The fifteenth is easily raised by cuttings, and

sometimes by seeds: and the seventeenth readily strikes from cuttings: the eighteenth produces seeds, but is more usually increased by cuttings: and the nineteenth and twentieth are readily propagated in the same way: the twenty-first is likewise raised from cuttings, but they are not very free in striking: the twenty-fourth is raised in this manner without difficulty: but in the twenty-fifth, from the branches running out speedily into flowering stalks, few are formed proper for cuttings, and these are struck with difficulty.

All these plants are highly ornamental, and afford considerable variety in collections of green-house plants.

PELLITORY, BASTARD. See ACHILLEAS.

PELLITORY OF SPAIN. See ANTHEMIS.

PENNY-ROYAL. See MENTHA PULEGIUM.

PENTAPETES, a genus comprising a plant of the exotic kind, for the stove.

It belongs to the class and order *Monadelphia Dodecandria*, and ranks in the natural order of *Columniferæ*.

The characters are: that the calyx is a double perianthium: outer three-leaved, one-sided, caducous: leaflets linear, acuminate: inner one-leafed, five-parted, permanent: segments lanceolate, acuminate, spreading, longer than the corolla: the corolla has five petals, roundish, spreading, fastened to the pitcher of stamens: the stamina have fifteen filaments, filiform, upright, shorter than the corolla, united below into a pentagon pitcher, but free above: anthers sagittate, upright: ligules five, linear-lanceolate, petal-shaped, upright, each between every three stamens, springing from the pitcher: the pistillum has an ovate germ: style filiform, thickened above, striated, longer than the stamens, permanent: stigma obsoletely five-toothed: the pericarpium is a membranaceous capsule, subglobular, acuminate, five-celled, five-valved: partitions contrary: the seeds eight, ovate, acute, four on each side, fastened within side to the partition.

The species is *P. Phœnicea*, Scarlet-flowered Pentapetes.

It is an annual plant, which dies in the autumn soon after it has ripened seeds: it has an upright stalk from two to near three feet high, sending out side branches the whole length: those from the lower part of the stalks are the longest: the others gradually diminish, so as to form part of a pyramid. They are garnished with leaves of different forms; the lower leaves, which are largest, are cut on their sides towards the base into two side lobes which are short, and the middle is extended two or three inches further in length, so that the leaves greatly resemble the points of halberts in their shape; they are slightly serrate, and of a lucid green on their upper side, but paler on their under, standing upon pretty long footstalks: the leaves which are on the upper part of the branches are much narrower, and some of them have very small indentures on their sides; they sit closer to the stalks, and are placed alternately: the flowers are axiliary; they come out for the most part singly, but sometimes there are two arising at the same place from the side of the footstalk of the leaves: the peduncle is short and slender; they are of a fine scarlet colour, appearing in July. It is a native of India.

Culture.—This plant may be increased by sowing the seeds upon a good hot-bed early in March; and when the plants are fit to remove there should be a new hot-bed prepared to receive them, into which must be plunged some small pots filled with good kitchen-garden earth; into each of which one plant should be put, giving them a little water to settle the earth to their roots, shading them from the sun till they have taken new root; when they should be treated in the same way as other tender exotic plants, admitting the free air to them every day in proportion to the warmth of the season, and covering the glasses with mats every evening. When the plants are advanced in their growth so as to fill the pots with their roots, they should be shifted into larger pots, filled with the same sort of earth as before, and plunged into another hot-bed, where they may remain as long as they can stand under the glasses of the bed without being injured; and afterwards they must be removed either into a stove or a glass-case, where they may be screened from the cold, and in warm weather have plenty of fresh air admitted to them.

These plants are sometimes turned out of the pots, when they are strong, and planted in warm borders; where, if the season prove very warm, the plants will flower tolerably.

PENTSTEMON, a genus containing plants of the hardy herbaceous flowering kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a one-leafed perianthium, five-parted, permanent: segments lanceolate, almost equal: the corolla one-petalled, two-lipped: tube longer than the calyx, gibbous above at the base, wider at top, and there ventricose underneath: upper lip upright bifid; segments ovate, blunt, shorter than the lower lip: lower lip three-parted; segments ovate, blunt, bent down, shorter than the tube:

the stamina have four filiform filaments, diverging at the tip, inserted into the base of the tube, and shorter than it; the two lower longer: anthers roundish, distant, included, bifid; with the lobes divaricating: the rudiment of a fifth filament between the upper ones inserted into the tube, the same length with the stamens, filiform, straight, bearded above at the tip: the pistillum is an ovate germ: style filiform, the length of the tube, bent down at the tip: stigma truncate: the pericarpium is an ovate capsule, acute, compressed, two-celled, two-valved: the seeds numerous, subglobular: the receptacle large.

The species cultivated is *P. lævigata*, Smooth Pentstemon.

It has a perennial, creeping, fibrous, white root: the stem a foot and half high and more, round, purple below, brachiate: the lower leaves ovate-acuminate, quite entire, petioled, sometimes purple underneath, on petioles winged to the base: the stem-leaves ovate-lanceolate, opposite, embracing, toothleted, smooth on both sides: the flowering branches in a manner dichotomous, with the flowers two together: the corolla pale purple, somewhat hirsute on the outside.

Culture.—This plant may be increased by sowing the seeds either in the autumn or early spring in the places where they are to remain, or in beds, to be removed in the beginning of the summer to the borders or clumps of the pleasure-grounds.

They afford variety among other plants of similar growth in these situations.

PEPPER. See PIPER.

PEPPER, GUINEA. See CAPSICUM.

PEPPER, JAMAICA. See MYRTUS.

PEPPERMINT. See MENTHA.

PERENNIAL PLANTS, are such as are of long duration. Such plants as are perpetuated by the roots, whether the leaves and stalks decay annually in winter, or always remain, provided the roots are of many years duration, are perennial. All plants, therefore, with abiding roots, both of the herbaceous, shrub, and tree kinds, are perennials; though in the general acceptation of the word perennial, it is most commonly applied to herbaceous vegetables with durable roots, more especially those of the flowery kind, which among gardeners are commonly called simply perennials, particularly the fibrous-rooted tribe: but it is equally applicable to fibrous, tuberous, and bulbous-rooted plants, whose roots are of several years' duration: likewise all shrubs and trees of every denomination, as having abiding roots, are perennial plants.

And these sorts of plants consist both of deciduous and ever-green kinds; those that cast their leaves, &c. in winter being termed deciduous perennials, and those which retain their leaves, ever-greens.

The herbaceous perennials, of the fibrous, tuberous, and bulbous-rooted kinds, for the greater part have annual stalks, rising in spring and decaying in winter; and a great many lose their leaves entirely also in that season, such as the perennial sun-flower, asters, and numerous other sorts; and many retain their leaves all the year, but not their stalks; as is exemplified in the auricula, polyanthus, some campanulas, pinks, carnations, and many other plants.

Numbers of the herbaceous perennials multiply exceedingly by off-sets of the root, by which they are readily propagated. See OFF-SET, &c.

All the tree and shrub perennials are durable in root, stem, and branch; but renew their leaves annually. Even the ever-green kinds, although they are in leaf the year round, put forth new leaves every year, to which the old ones gradually give place. See DECIDUOUS and EVER-GREEN TREES, &c.

PERIPLOCA, a genus comprising plants of the woody climbing kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Contortæ*.

The characters are: that the calyx is a five-cleft perianthium, very small, segments ovate; permanent: the corolla one-petalled, wheel-shaped, five-parted: segments oblong, linear, truncated, emarginate: nectary very small, five-cleft, surrounding the genitals, putting out five threads, curved inwards, shorter than the corolla, and alternate with it: the stamina have short filaments, curved inwards, converging, villose: anthers twin, acuminate, converging over the stigma; with lateral cells: pollen bags five, at the notches of the stigma, each common to two anthers: the pistillum consists of two ovate germs, approximating: styles united at top: stigma capitate, convex, five-cornered, with the corners notched: the pericarpium consists of two large follicles, oblong, ventricose, one-celled, one-valved, glued together at the tip: the seeds very many, imbricated, crowned with a down: the receptacle longitudinal, filiform.

The species cultivated are: 1. *P. Græca*, Common Virginian Silk or Periploca; 2. *P. Secamone*, Green Periploca; 3. *P. Indica*, Indian Periploca; 4. *P. Africana*, African Periploca.

The first has the stems shrubby, twining round any support more than forty feet in height, covered with a dark bark, and sending out slender branches which twine round each other: the leaves are ovate-lanceolate, near four inches long,

and two broad in the middle, of a lucid green on their upper side, but pale on their under, opposite, on short footstalks: the flowers come out towards the ends of the small branches in bunches, and are of a purple colour. It is a native of Syria, flowering in July and August, but rarely ripening seeds in this climate.

It is sometimes called *Climbing Dog's-Bane.*

The second species has a twining, shrubby, even stem: the leaves are opposite, petioled, even, underneath paler, veined transversely: the panicles axillary, alternate, dichotomous, shorter than the leaves: the flowers are small. It differs obviously from the first sort in its small copious flowers. It is said to be a native of Egypt; but its place of growth is uncertain; flowering in July.

The third has many slender stalks, which twine about each other, and by a shrub or other support will rise near three feet high, putting out several small side-branches; these are hairy, as are also the leaves; which are about three quarters of an inch long, and half an inch broad, standing by pairs upon very short footstalks: the flowers come out in small bunches from the side of the stalks; are small, of a dull purple colour, and have a sweet scent. It flowers in the summer, but does not produce seeds in this climate. It is a native of the Cape.

There is a variety with smooth leaves and stalks, which comes from the same place.

Culture.—These plants may be easily increased by layers made from the young wood in the early spring or summer season. When they are fully rooted, they may be taken off and planted out, the first or hardy kind, either where they are to remain, or in the nursery, to be afterwards removed; and the two last, or tender sorts, into pots, to be protected during the winter.

The first sort likewise often succeeds by cuttings, and also the two last by the use of the hot-bed.

They may all be increased also by sowing the seeds procured from abroad in pots of light earth, plunging them in the hot-bed.

They should all be placed near support, to prevent their trailing upon the ground and fastening about other plants.

Where the two last sorts are kept constantly plunged in the tan-bed of the stove, they thrive and flower much better than in any other situation, but they should not be kept too warm in winter; and in the summer they should have a large share of free air admitted to them; for when they are kept too close their leaves will be covered with insects, and the plants become sickly in a short time.

The first sorts only require a little protection in the winter. They all afford variety among potted plants.

PERIWINCLE. See VINCA.

PEROLA. See MOMORDICA.

PERSEA. See LAURUS.

PERSIAN LILY. See FRITILLARIA.

PERSICA. See AMYGDALUS.

PERSICARIA. See POLYGONUM.

PERUVIAN MASTICK TREE. See SCHINUS.

PETIVERIA, a genus containing plants of the woody exotic perennial evergreen kind for the stove.

It belongs to the class and order *Hexandria Tetragynia* (*Heptandria Monogynia*), and ranks in the natural order of *Holoraceæ.*

The characters are: that the calyx is a four-leaved perianthium: leaflets linear, blunt, equal, spreading, permanent: there is no corolla (except the coloured calyx): the stamina have six or eight unequal, awl-shaped, converging filaments: anthers erect, linear-sagittate, bifid at top: the pistillum is an ovate germ, compressed, emarginate: style very short, lateral, in the groove of the germ; styles four, permanent, finally bent outwards, spinescent: stigma pencil-shaped: there is no pericarpium, except the crust over the seed: the seed single, oblong, narrower below, roundish, compressed, emarginate; with four barbed hooks, bent back outwards, rigid, acute, the middle ones longer (naked, but armed above with reflex spines).

The species are: 1. *P. alliacea,* Common Guinea-Hen Weed; 2. *P. octandra,* Dwarf Guinea-Hen Weed.

The first has a strong root, striking deep into the ground: the stems from two to three feet high, jointed, and becoming woody at bottom: the leaves oblong, three inches long and an inch and half broad, of a deep green and veined, placed alternately on short footstalks: the flowers are produced in slender spikes at the ends of the branches; are very small, and make no figure. It is common in the West Indies, flowering here in June.

It thrives most in a dry gravelly soil and a shady situation.

The second species differs from the first, in having a shorter and narrower stalk; and in the flowers having eight stamens; and, according to Linnæus, the leaves are more rigid and quite smooth, the filaments purple and not white. It is a native of the West Indies.

Culture.—These plants may be increased by slips or cuttings planted out in the summer, as well as by seeds; which must be sown on a hot-bed early in the spring. When the plants are

come up, they should be removed into separate pots, and plunged into a moderate hot-bed. When the plants have obtained a good share of strength, they should be inured by degrees to the open air, into which they may be removed towards the end of June, placing them in a warm situation, where they may remain till autumn, when they must be placed in the stove, and during winter have a moderate degree of warmth.

They afford variety, and produce a good effect among other potted plants.

PETOLA. See MOMORDICA.

PETREA, a genus containing a plant of the climbing exotic shrubby kind for the stove.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a one-leafed, bell-shaped perianthium: border five-parted, spreading, very large, coloured, permanent: segments oblong, blunt, closed at the throat by five doubled, truncated scales: the corolla one-petalled, wheel-shaped, unequal, less than the calyx: tube very short: border flat, five-cleft: segments rounded, almost equal, spreading very much; the middle one larger and of a different colour: the stamina have four filaments, concealed within the tube of the corolla, ascending, two shorter: anthers oval, erect: the pistillum is an ovate germ: style simple, the length of the stamens: stigma blunt: the pericarpium is a capsule obovate, flat at top, two-celled, concealed at the bottom of the calyx: the seed single, fleshy.

The species is *P. volubilis*, Twining Petrea.

This rises with a woody stalk to the height of fifteen or sixteen feet, covered with a light-gray bark, and sending out several long branches, having a whiter bark than the stem: the leaves are at each joint, on the lower part of the branches placed by threes, but higher up by pairs; are five inches long, and two inches and a half broad in the middle, drawing to a point at each end; stiff, and their surface is rough, of a light green, having a strong dark midrib, with several transverse veins running to the borders, which are entire: the flowers are produced at the ends of the branches in loose bunches, nine or ten inches long; each flower upon a slender pedicel about an inch in length, of a fine blue colour.

There is a variety with bright blue petals.

Culture.—This is increased by seeds, which must be obtained from the places where the trees grow naturally, and be sown in pots plunged in a good hot-bed; and when the plants come up, they should be each planted in a separate small pot filled with light loamy earth, and replunged into a hot-bed of tanner's bark, and be afterwards placed in the bark-bed in the stove, where they must constantly remain, and be treated like other plants of the same country.

They afford ornament in stove collections.

PETTY WHIN. See GENISTA.

PHASEOLUS, a genus containing plants of the climbing esculent and flowering kinds.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leafed, two-lipped perianthium: upper lip emarginate; lower three-toothed: the corolla papilionaceous: banner heart-shaped, blunt, emarginate, reclined; the side bent back: wings ovate, the length of the banner, placed on long claws: keel narrow, rolled spirally contrary to the sun: the stamina have diadelphous filaments, (simple and nine-cleft,) within the keel, spiral: anthers ten, simple: the pistillum is an oblong germ, compressed, villose: style filiform, bent in spirally, pubescent above: stigma blunt, thickish, villose: the pericarpium is a legume long, straight, coriaceous, blunt with a point: the seeds kidney-form, oblong, compressed.

The species is *P. vulgaris*, Common Kidney-Bean.

Other species may be cultivated for the purpose of variety as flower-plants.

It has the stem more or less twining, but in some of the cultivated dwarf varieties scarcely at all so, quite simple or unbranched: the leaves ternate, acuminate, rounded at the base, rough, on long petioles: the flowers axillary, in twin racemes, or else on twin petioles: corolla white, yellow, purple or red: the banner has a callus, but a small one, and placed near the edge above the claw: there is a white nectariferous scale between the claw of the banner and the single stamen, bent upwards, and growing to the filament: besides this, an obliquely bell-shaped, pellucid, striated nectary surrounds the pedicel of the germ within the connate filament; the size differs in the several varieties: the legume oblong, swelling a little at the seeds, when ripe one-celled: the seeds several, ovate or oblong kidney-shaped, smooth and shining; varying much in shape and size, but particularly in colour; being white, black, blue, red, and variously spotted. It is annual, and a native of both the Indies.

They were formerly called *Sperage Beans*, *French Beans*, &c.

The principal sub-varieties of the dwarf, or low-growing sorts, are: the early white dwarf,

the early speckled dwarf; the early yellow; the early liver-coloured; the early dun-coloured dwarf; the larger white or cream-coloured dwarf; the larger black and white speckled dwarf; the black-streaked dwarf; the red speckled dwarf; the speckled amber dwarf; the sparrow-egg dwarf; the Canterbury white dwarf; the Battersea white dwarf; the China speckled dwarf, consisting of black and white speckled, brown and white, red and white, &c. These are of upright dwarf bushy growth, rarely exceeding fifteen or eighteen inches in height; and seldom throw out runners, except the Canterbury and Battersea sorts, which sometimes send out a few stragglers, but which seldom extend to much distance.

The first three or four sorts are at present in most esteem for their coming early into bearing: being of smaller growth than the other sorts, they sooner form themselves for blossom and bearing, of course are proper for planting for the earliest crops, and for forcing in hot-beds, &c. As they, however, do not continue long in bearing, they are not so proper for the main crops as the larger dwarf sorts; particularly the black and white speckled, the Canterbury and Battersea kinds, which are all excellent bearers; but the two latter most of all, and the pods are smaller, more numerous, and esteemed the sweetest eating of all the dwarf kinds whilst young, though the pods of the large white dwarf, and the speckled kind in particular, continue exceedingly good, even when of pretty large size, but superior in the latter, both in a more plentiful longer production, and goodness for eating, being excellent for a principal crop in a family garden; as are also the Battersea and Canterbury sorts, which should not be omitted on the same occasion; and these two varieties are in most esteem for general culture by the market-gardeners, for main crops, as being by them considered both the most profitable in bearing, and having a smaller pod, the most saleable in the markets: however, any of the other dwarf sorts are also proper to cultivate occasionally, for variety, both for private and public use.

There is a scarlet bean which is by some considered a distinct species, but probably a variety of this, the running or twining stalks of which, if properly supported, rise to the height of twelve or fourteen feet: the leaves are smaller than those of the common garden-bean: the flowers grow in large spikes, are much bigger, and of a deep scarlet colour: the pods are large and rough; and the seeds are purple marked with black, sometimes pure white.

The principal subvarieties of these are: the large scarlet climber, which rises with many twining runners upon support, eight or ten to twelve or fifteen feet high, having numerous large clusters of scarlet flowers, succeeded by large, thick, rough, fleshy seed-pods, containing large, thick, purplish beans.

The large white climber; having large clusters of white flowers, large, thick, rough seed-pods, and white seed. These sorts are alike in respect to their growth, differing only in the colour of their flowers and seed, which is pretty permanent: they are great bearers; and the plants of the same crop continue in bearing from July or August until October; the pods, even when large, boiling exceedingly green, being remarkably tender and well flavoured.

The large Dutch climber, which rises with twining runners, upon support, ten or twelve feet high; numerous clusters of white flowers, succeeded by long, broad, compressed-flat, smooth pods, containing large, oblong, flat, white seed: this is also a very great bearer, but it does not continue near so long in production as the two former climbers; its pods, however, which are very long, smooth, and fleshy, boil exceedingly green, tender, and good: and, of the runner kind, it is a very desirable family bean, inferior to none for sweetness of flavour.

But the following sorts are of a more moderate growth. The negro runner: the Battersea white runner: and, the Canterbury runner; which, though climbers, ramble less, but bear plentifully and continue some time. The pods are smaller, but very tender, very delicate in eating, while in moderate young growth.

Culture.—As these are all plants of the annual tender tribe, they require to be raised every year, in the latter spring and summer months, as from April till June or later, by different sowings, at the distance of a few weeks, when the danger of frosts is over.

Culture in the Dwarf Kinds.—In cultivating these sorts, proper kinds should be chosen for the different crops. As for the forward ones, any of the early sorts are proper, but the early white, early speckled, dun, and yellow kinds are rather the earliest bearers; and for the main crops any of the larger dwarf kinds, though preference should be given to the speckled, the Battersea, and the Canterbury dwarf kinds, as being all plentiful bearers, and continuing long in successional bearing on the same plants.

These sorts of beans, from their tender nature, seldom admit of being sown or planted earlier than April, when the weather is become a little settled; as the seed is not only impatient of cold moisture in the ground, and very subject

to rot, but the young plants that happen to come up early are often cut off, or greatly injured, by the morning frosts, or cold cutting winds, that frequently prevail in the beginning of this and the following month. But towards the middle of it, if the weather is fine and dry, some may be ventured in a warm dry situation and light soil, for the early natural crops; and in the latter end of it, or beginning of the following month, when the weather is suitable, it is proper to begin to put in the first general crops in the open quarters, &c., and to continue planting some every fortnight or three weeks until the middle or latter end of July; by which means regular supplies of young kidney-beans may be had for the table or market, from about the middle or latter end of June until the beginning of the autumn season.

Where, however, it is desired to try them as early as possible in the full ground, some may be put in about the beginning of April, in dry weather, close under a warm wall, or other similar situation where the soil is dry; and in a fortnight after some more, in a larger portion. If the first should fail, these sometimes succeed; and if both are attended with success, one will follow the other in bearing; though it is two to one against the success of the first planting. But as only a few should be planted so early, if they fail, it is only the loss of a little labour and seed, as the same ground will do again; and if they succeed and produce only a few but a week sooner than common, they will be esteemed a rarity, either for family use or the market.

They all succeed in any common dry soil of the garden; but for the forward crops, a dry light soil should constantly be chosen, rejecting heavy and wet grounds, for in such a soil most of the early-planted seed infallibly rot. Likewise for the early crops, it is higly requisite to have a sheltered warm situation full to the sun: a warm south border is a very proper exposure; but for the main crops, any of the open quarters may be made use of with propriety.

The methods of sowing or planting all the sorts is in shallow drills, from two to three feet asunder, to remain where sown.

For the early crops, taking advantage of a dry day, neat drills should be drawn with a hoe from north to south, two feet or thirty inches asunder, and near an inch deep; and to afford a greater chance of success, a drill may be made close along under the wall, where practicable; in these drills the beans should be dropped in rows along the bottoms, only about an inch and a half asunder, as many of this early sowing may fail; covering them evenly with the earth, not more than an inch deep; as when covered too deep at an early period many are apt to rot, by the cold moist dampness of the earth. As soon as they are covered in, the surface should be lightly raked smooth; when the work is finished. They come up in about twelve days or a fortnight; when they should be managed as directed below; and the plants mostly come into bearing in six or eight weeks afterwards.

For the main crops to be planted aftewards, almost any situation, either in the borders, or an open exposure, may be employed; though an open situation in any of the large quarters is, as has been seen, the most proper. In this case drills should be drawn two feet and a half asunder, and about one inch deep; or, when it is designed to plant rows of savoys or cabbage-plants between, (as is often practised where necessary to husband the ground to the best advantage, but which should always be avoided if possible,) the drills should be a yard asunder at least; the beans being dropped in singly along the bottom of each drill, about two or three inches asunder, covering them in evenly afterwards with the earth about an inch deep, and finishing with a light raking to smooth the surface. They mostly come up at this season in ten or twelve days, and sometimes sooner in fine weather; and the plants usually come into plentiful bearing in six or eight weeks afterwards.

In planting out the later general crops, when the weather proves very dry and hot, and the ground of course very dry, it is proper either to soak the beans a few hours in soft water previous to planting; or, instead of this, letting the drills for the reception of the beans be well watered, and planting them immediately as above, covering them in the proper depth. Either of these methods is very advisable in dry weather in the heat of summer; it being necessary at such times to promote the free germination of the seed, in order to bring them up soon and regularly, as they would otherwise rise in a straggling manner.

In regard to the general Culture.—When the plants of all the above crops are come up, they are in general to remain where sown or planted, to yield their produce; though when necessary some may be transplanted, keeping them clean from weeds by occasional hoeing in dry weather; and when the plants are advanced about three or four inches high, hoeing up a little earth to their stems on each side, which will forward their growth and promote their strength; continuing the care of destroying weeds as often as their growth may render it necessary; which is principally all the culture required for these sorts, in the full ground, till they arrive at a bearing state, and

their produce is fit to gather; except to the earliest crops on warm sunny borders, in very dry hot weather, when it may be beneficial to give occasional waterings to the plants in the mornings or evenings, especially when in blossom, and fruiting.

In gathering the produce of these sorts of beans, it should always be performed when the pods are quite young, or at least before they become large, and the beans in them attain any considerable size, as they are then tough, stringy, and rank tasted; and in order to continue the plants in bearing as long as possible, the gatherings should be regularly repeated two or three times a week; for by gathering the pods often and clean, as they become fit, the plants blossom more abundantly, and continue fruiting more plentifully and for a much longer period.

Large quantities of these dwarf kinds are often cultivated in the gardens and fields in the neighbourhood of large towns, for supplying the markets during the latter part of the summer season.

Culture of early Crops by artificial Heat.—In order to have these sorts of beans as early as possible, recourse is had to raising them by the aid of heat, in two or three different methods, as by raising the plants in a hot-bed, an inch or two high, and then planting them out into a warm border, by raising and continuing the plants in a hot-bed so as to bear their crops, and by aid of a hot-house.

In the first of these methods, they may be forwarded a fortnight earlier than those sown entirely in the full-ground; for this purpose, towards the latter end of March, or early in the following month, a moderate hot-bed should be prepared a foot and a half or two feet in depth of dung, covered either with a frame or hand glasses, or arched over with hoops or rods, to be covered with mats; earthing the bed with fine, light, rich mould, six inches deep; then having some seed of the early sorts, it should be sown pretty close either all over the surface, an inch or two apart, covering them with earth about half an inch deep, or in small close drills, earthing them over the same depth; or where only a few are wanted, they may be sown in large pots at about an inch distance and half a one deep, and the pots plunged into a hot-bed, or placed in a hot-house; and when the plants come up, the pots be removed by degrees into the full air in warm days, to harden the plants for transplantation: and it is a good method to plant a quantity of beans in small pots (thirty-twos or forty-eights), three in each pot, plunging the pots in a hot-bed; and when the plants are fit for being transplanted out, they can be readily turned out of the pots with the whole ball of earth about their roots, so as not to feel their removal. But in raising the plants in either of these methods with this view, attention is particularly necessary to inure them gradually to the full air, by taking off the covers of the glasses or mats in all mild weather from those in hot-beds, and only covering them in cold nights; or the pots in the hot-house should be placed abroad in fine days; but as they advance in growth, and the weather becomes warmer, they must be exposed by degrees to the full air, day and night, to harden them properly, previously to their being finally transplanted out. They should also be allowed frequent moderate refreshments of water.

When they have shot out their proper leaves an inch or two broad, and all danger of frosty mornings and other bad weather is apparently over, proceed to plant them out into a warm border, under a wall or other fence, taking them up with their roots as entire as possible, and with as much earth as will hang about them, or with a small ball of earth; and those raised in small pots by threes may also be easily turned out with the whole ball of earth entire: and as to the mode of planting them, those which cannot readily be taken up with balls may be planted by dibble, in a row along close under a south wall, or some in cross rows two feet asunder, forming shallow drills for their reception, in which the plants should be set three or four inches apart; but those with good balls about their roots should be holed in with a trowel; and if some of those for a small early production are also disposed in patches, three plants in each, so as to be covered occasionally in cold nights with hand-glasses, it will be found very beneficial in forwarding their growth. As soon as they are planted, in either method, a moderate watering should be given to settle the earth close about the roots, and repeated in dry weather as there may be occasion, till the plants have taken fresh root in their new situations.

After this they should be kept clean from weeds; and when they are a little advanced in growth, some earth drawn lightly up about their stems; and as the warm season advances, if it prove hot and dry, refreshments of water will greatly forward and strengthen the growth of the plants and forward their perfection.

In the second method—about the beginning or towards the middle of February a dung hot-bed should be made, either a small one in which to sow the beans thick for being transplanted, when the plants are about an inch high, into a larger

hot-bed, to remain for bearing; or a large one at first, in which to sow the seed and continue the plants to attain perfection, as for one, two, or more three-light frames, about two feet and a half high in dung: and when the great heat and steam are a little abated, the bed should be covered with light, rich, dry mould, six or eight inches thick, for the reception of the seed; then small drills should be drawn from the back to the front of the bed, near an inch deep, and about fifteen or eighteen inches asunder; placing the beans two or three inches apart, and covering them evenly with the earth the above depth, then putting on the lights, tilting them behind an inch or two high daily, to give vent to the steam; and when the plants appear, continuing every day to admit air to them at all opportunities, in proportion to the temperature of the weather and heat of the bed, to prevent their drawing up weak, and promote their strength as they rise in height; bestowing also at this time moderate refreshments of water in sunny days; and when they are two or three inches high, applying a little earth to their shanks; likewise supporting a moderate heat in the bed during the cold weather, by occasional linings of hot dung: and accordingly as the plants advance in growth, and the warm season increases, augmenting gradually the portion of fresh air daily to harden them by degrees, so as almost to be fully exposed occasionally in very warm days, especially when beginning to blossom; but keeping them close on nights; continuing also the care of frequent light waterings, which must be increased in quantity as the plants advance in size, particularly when they are in blossom and in a fruiting state: in their advanced growth, if they press much against the glasses of the frame, it is proper to raise it at bottom two or three inches, to give rooom at top for their free growth, which is necessary to promote a plentiful bloom for furnishing a sufficiently full crop of beans.

In this mode they may be had at as early a period as possible, as in April or early in May; but to have a constant succession of early kidney-beans till crops in the natural-ground come in, another crop should be brought forward in hot-beds, as above, in three weeks after the first hot-bed is made up.

Where frames cannot be afforded for the above purpose, it may be effected in March with occasional coverings of mats; a hot-bed being made about two feet high of dung, earthing it directly six or seven inches thick, sowing the beans as directed above, then arching the bed over with hoops, &c., and covering it every night, and in all bad weather, with mats; but admitting the free air every mild day, gradually hardening the plants as they acquire strength, and giving occasional waterings.

In the third method—early kidney-beans may be obtained with very little trouble at almost any time in winter or spring, by raising them in pots, or long narrow trough-like boxes, about two or three feet long and eight or ten inches broad at top, placing them any where in the lower part of the hot-house; when the plants will succeed.

The proper kinds for this purpose are: the early white, yellow, and dun-coloured dwarfs, the latter being rather a preferable bearer, continuing in longer production; and the speckled dwarf also succeeds very well, and continues long in bearing in this mode of culture.

In respect to the method of management in these cases, any time in winter or early in spring, some large pots (sixteens or twenty-fours) or boxes may be filled with light rich earth, and placed in the hot-house, some being arranged upon the top of the surrounding wall of the bark-bed, and on the top of the front flues towards the upright glasses, and in other similar convenient situations as room may admit, planting in each pot four beans, near an inch deep; or, if boxes, along the middle, in a sort of double row, triangular-ways, about four inches asunder, and the above depth: they soon germinate, and in a few days appear above ground: when they begin to sprout, it is proper to moisten the mould with a little water, which facilitates the protrusion of the plants out of the earth.

Their after-culture is very easy:—when they are come up, frequent waterings should be given, as three times a week, as the earth dries very fast. It should always be kept moderately moist, in order that the plants may blossom freely and produce a plentiful crop, which is often in as great perfection as in the full-ground.

As in the other crops, they should be gathered often; as it is the way to continue the plants long in a bearing state.

A regular succession of early young crops of these beans may be obtained in this way two or three months, by repeated sowings at the interval of about three weeks, so as to have young plants advancing in pots or boxes in two or three different degrees of growth succeeding each other.

Where there is not much stove-room, it may be proper to plant the beans for succession crops in small pots (forty-eights), three beans in each; and as these take up but little room, they may be stowed any where close together, or between the other larger pots: the plants will come up

and be advancing in growth, so as that when those of the preceding crops are going off, these may be readily turned out of the small pots with the whole ball of earth about their roots, and replanted into large pots, &c. to remain for fruiting, giving water at planting, and frequently afterwards, as above, in the first crop: by this practice a month's growth in the plants may be gained, and a constant succession of beans for the table be had.

Culture in the Climbing Kinds.—These are raised from the seed, by sowing it annually in the later spring and summer months, as in the dwarf sorts. For this purpose the scarlet runner and the white sub-variety of it are the most proper for the general crops, as being not only very great bearers and continuing in perfection two or three months, but from their pods, when even pretty large, remaining green, fleshy, tender, and well flavoured. Some of the Dutch runners, and any of the other climbers, may also be cultivated with advantage.

The most proper season to begin planting the main crops of all those sorts is the first or second week in May, if the weather be fine; as being of a delicate nature like the dwarfs, when planted earlier, both the seed and plants are subject to danger from the same causes: however, in a south border, or some similar warm situation and dry soil, a few may be planted in the middle or towards the latter end of April, to take their chance; but for the general crops, the most successful season for planting is from the above period until the middle or latter end of June, but not later than the beginning of July: but where the scarlet kind and variety are planted principally, one planting in May or beginning of June will come into bearing in July or August; and when the pods are kept gathered clean, according as they are fit for use, the plants continue shooting, blossoming, and bearing abundantly until the end of September, and often until the end of October, or even till destroyed by the cold and frosts: but two plantings of any of the sorts of runners, one in May and the other in June, or early in July, are amply sufficient to furnish a very abundant supply for the whole season of this sort of crop.

All these kinds prosper almost any where in the garden, both in close and open situations; choosing principally a lightish soil, especially for the forward crops: and the richer the ground, the better it is for the purpose.

As all the running kinds require support of some kind or other to climb upon, they should be planted either in wide rows, for the convenience of placing tall sticks or poles along each row for the runners of the plants to wind themselves round for support, or be planted against some sort of fence or treillage work for the same purpose of training up and supporting the runners. When, however, it is designed to train them upon sticks or poles, drills should be drawn four feet or four and a half asunder, especially for the larger kinds, and an inch deep, in which the beans should be dropped three or four inches apart; covering them in evenly with earth, and raking the surface smooth. The beans will sprout in a few days, and come up in less than a fortnight.

When the plants are three or four inches high, a little earth should be drawn with a hoe up to their stems, to strengthen them, and encourage them to send forth strong runners. At this time also all weeds between the rows should be cut up and be removed.

As soon as they begin to push forth their runners, some tall sticks or poles should be placed for them to ascend upon; and as they are placed, conducting the runners towards them, in a direction according to their natural mode of climbing, which is generally to the right, or contrary to the sun's motion: they will thus naturally encircle the sticks or poles, and ascend to their tops, even if ten or fifteen feet high, producing blossoms and fruit from bottom to top.

When it is intended to plant these sorts against fences for support, it should be done in a row close along to the fence; and if against a wall or paling, either placing tall poles, or drawing some strong packthreads from top to bottom at six inches distance; the plants readily twining round them, and supporting themselves to a great height.

In gathering the produce of all these kinds, the same circumstances should be attended to as in the dwarfs—to gather the pods whilst young and tender; and to continue the plants long in full bearing, always gathering the pods clean as they become of a proper size: and they will continue fruiting more abundantly and in better perfection.

When it is intended to cultivate any of these climbing beans as flowering-plants, the scarlet kind and its variety are the best sorts for the purpose. They should be sown as above in any of the compartments of the pleasure-garden, in patches, alternately scarlet and white sort, two or three beans in each patch, about an inch deep; and when the plants are up and begin to push forth runners, tall poles or branchy sticks should be placed for them to climb upon: they will thus effect a very fine variety all summer, until the autumn.

These kinds of beans are also often employed to run over arbours, and to twine round lines, from the top of tall stakes, and stems of small trees; also to run up along the sides of houses, or against walls, either upon poles, or upon packthread-strings, suspended from above, about which they will twine themselves many feet high, bearing abundance of flowers and fruit: they are likewise sometimes trained to form shady walks, by means of sticks or poles arranged along each side, or by support of a sort of treillage-work, ranging some tall stakes five or six feet asunder, railing them along the top with poles, or pan-tile laths, or extending strong packthread lines; and from either of which suspending strings to the ground, six or eight inches asunder, fastening them down with pegs: upon these strings the plants will climb, and form a close hedge; or they might be occasionally arched over the top in a similar manner, for the runners to extend, and form a vaulted roof and complete shade. Thus this fine climber may be trained in various ways according to fancy, both for use and ornament; from which those not accommodated with gardens may plant them in pots or boxes, to be placed in court-yards, windows, balconies, &c.

Saving Seed.—In order to have perfectly good seed, it is necessary to sow a sufficient quantity in rows on purpose, suffering the whole crop of the plants to remain without gathering any for use: by this means the seed ripens early, and in the highest perfection; which is essentially necessary for those who design the seed for public supply. In private gardens, and many others, they often, however, after having gathered the prime of the principal crops, leave the latter produce of them to grow for seed; which, although it may be tolerably good, is not always so large, plump, and fine, as in the former method.

When the seed is quite ripe, which is easily known by examining a few of the pods, the plants should be pulled up and spread loosely along in rows, or upon any low hedges, &c., turning them occasionally that the beans may dry and harden well; which when effected, either thrash them out directly, or lay them up in some dry loft or other room till convenient; and when thrashed out and cleared from the rubbish, spread them upon some clean airy floor, or some such place in the dry, to harden perfectly; then they should be put up in bags for next year's use:—some think the change of seed of this kind to be of much consequence.

PHILADELPHUS, a genus containing plants of the hardy deciduous flowering shrubby kind.

It belongs to the class and order *Icosandria Monogynia*, and ranks in the natural order of *Hesperideæ*.

The characters are: that the calyx is a one-leafed perianthium, four- or five-parted, acuminate, permanent: the corolla has four or five roundish petals, flat, large, spreading: the stamina have twenty or twenty-five awl-shaped filaments, the length of the calyx: anthers erect, four-grooved: the pistillum is an inferior germ: style filiform, four- or five-parted: stigmas simple: the pericarpium is an ovate capsule, acuminate at both ends, naked at the top by the calyx being barked, four- or five-celled: partitions contrary: the seeds numerous, oblong, small, decumbent, arilled, fastened to the thickened edge of the partitions: arils club-shaped, acuminate, toothleted at the base.

The species is *P. coronarius*, Common Syringa or Mock Orange.

It is a shrub that sends up a great number of slender stalks from the root, seven or eight feet in height, having a gray bark, and putting forth several short branches from their sides: the leaves ovate or ovate-lanceolate; those upon the young shoots three inches and a half long, and two broad in the middle, terminating in acute points, and having several indentures on their edges; they are rough and of a deep green on their upper side, and pale on their under; stand opposite upon very short footstalks, and have the taste of fresh cucumbers: the flowers come out from the side, and at the end of the branches, in loose bunches, each on a short pedicel; they are white, and have a strong scent, which at some distance resembles that of orange-flowers; but near, it is too powerful for most persons: the flowers appear at the end of May, and continue a great part of June. It is a native, probably, of the South of Europe.

There are two varieties: the dwarf syringa, which seldom rises above three feet high: the leaves are shorter, more ovate, and little indented on their edges: the flowers come out singly from the side of the branches, and have a double or treble row of petals of the same size and form as the other, and the flowers have the same scent; but flowering very rarely, it is not so much in estimation.

The Carolina syringa, which rises with a shrubby stalk about sixteen feet high, sending out slender branches from the sides, opposite to each other: the leaves smooth, shaped like those of the pear-tree, entire, opposite, on pretty long footstalks: the flowers are produced at the ends of the branches; they are large, but without scent; each has four white oval petals spreading open, and a large calyx composed of four acute-pointed leaflets.

Culture.—These plants may be increased by suckers, layers, and cuttings.

The suckers are sent from the roots in great plenty; these should be taken from the old plants in autumn, and be planted in a nursery, to grow one or two years till they have obtained sufficient strength, when they may be removed to the places where they are to remain.

The layers may be laid down in the autumn, being made from the young twigs. These may be taken off in the following autumn, when well rooted, being planted out where they are to remain.

The cuttings of the young shoots may be planted in the autumn, in a shady situation, where they soon form plants.

The plants are extremely hardy, and thrive in almost any soil or situation, but grow taller in light good ground than in that which is stiff.

They are commonly disposed in plantations of flowering shrubs, among others of the same growth; mixing very well with lilacs, gelder roses, and laburnums; and particularly valuable from their thriving under the shade of trees, and forming a blockade against low buildings, where persons have no objection to their strong smell.

PHILLYREA, a genus containing plants of the hardy evergreen shrubby kind.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Sepiariæ*.

The characters are: that the calyx is a one-leafed perianthium, tubular, four-toothed, very small, permanent: the corolla one-petalled, funnel-form: tube scarcely any: border four-parted, revolute, acute; segments ovate: the stamina have two filaments, opposite, short: anthers simple, erect: the pistillum is a superior roundish germ: style simple, the length of the stamens: stigma thickish: the pericarpium is an ovate-globular, two-celled berry: the seeds solitary, flattish on one side, convex on the other, one of them frequently abortive.

The species are: 1. *P. media*, Lance-leaved Phillyrea; 2. *P. angustifolia*, Narrow-leaved Phillyrea; 3. *P. latifolia*, Broad-leaved Phillyrea.

The first rises to an equal height with the third or true sort, but the branches are more diffused, and have a darker bark: the leaves are of a darker green, are more than two inches long, and almost an inch and half broad, a little serrate on their edges, opposite on short footstalks: the flowers axillary, in long bunches, of an herbaceous white colour.

There are several varieties: namely, the privet-leaved and olive-leaved; which are of humbler growth, seldom more than eight or ten feet high: the branches of the first are weaker, and spread wider, and are covered with a light brown bark: the leaves are stiff, almost two inches long, and half an inch broad in the middle, drawing to a point at both ends, and sit close to the branches: the flowers are in little axillary clusters, small and whiter. In the latter the branches are stronger, and spread out wider; the bark is of a lighter colour: the leaves are stiff, smooth, and entire, on very short footstalks, of a lucid green, and terminating in a point: the flowers in clusters, on pretty long peduncles, from the axils of the young branches, small and white. And in the Kew catalogue there are three other varieties mentioned: namely, the long-branched, which has long upright branches; the drooping, which has the branches hanging down and straddling; and the box-leaved.

The second species has the stalk ten or twelve feet high, sending out opposite branches, covered with a brown bark spotted with white: the leaves are smooth, stiff, narrow, entire, sessile, about an inch and half long, and half an inch broad in the middle, drawing to a point at both ends, of a light green, and pointing upwards: the flowers come out in large clusters at each joint of the branches, sitting close like whorled flowers, and almost surrounding them; they are small and white.

There is a variety termed rosemary-leaved, which is of humbler growth, seldom rising more than four or five feet high, sending out slender, opposite, straight branches, sparsedly disposed: the leaves dark green, stiff, and entire; about an inch long, and not more than an eighth of an inch broad, sessile: the flowers are small, white, in clusters from the side of the branches: the berries very small, rarely ripening in this climate. And in the Kew catalogue another variety is mentioned, under the name of Dwarf Phillyrea.

The third, True or Smooth Broad-leaved, rises with a strong upright stem to the height of eighteen or twenty feet, dividing into several branches, covered with a smooth grayish bark: the leaves are entire (or obscurely serrate), firm, of a light green, an inch and half long, and an inch broad, on short footstalks: the flowers are axillary, on each side, of an herbaceous white colour, in small clusters; they come out in March, but being small make no great appearance.

There is a variety, the prickly broad-leaved, which is as high as the smooth one, and sends out several strong branches, which grow erect, and are covered with a gray bark: the leaves are an inch and half long, and an inch broad, firm,

of a lucid green, and serrate, each serrature ending in a spine. And the Kew Catalogue has another, under the name of Ilex-leaved.

Culture.—These plants are capable of being increased either from seeds or layers, but the latter being the most expeditious method is chiefly preferred in this climate.

The best season for laying them down is in autumn, when the ground should be dug round the stems of the plants intended to be layed, rendering it very loose; then making choice of a smooth part of the shoot, a slit should be made in it upwards, in the manner practised in laying carnations, bending the branch gently down to the ground, making a hollow place to receive it; and having placed the part which was slit into the ground, so as that the slit may be open, it should be fastened down with a forked stick that it may remain steady, covering that part of the branch with earth about three inches thick, keeping the upper part erect. The layers must be kept clean from weeds in the spring and summer following, as if suffered to grow up amongst them, they will prevent their taking root.

In the autumn following most of the plants thus laid will be rooted, at which time they may be taken off, and carefully planted in a nursery, where they may be trained three or four years in the manner they are intended to grow; during which time the ground should be dug between the rows, and be cut about the roots of the plants every year, to cause them to strike out strong fibres, so as to support a good ball of earth when they are removed. Their stems should likewise be well supported with stakes, in order to make them straight, otherwise they are very apt to grow crooked and unsightly. When they have been thus managed three or four years, they may be removed into the places where they are designed to remain. The best time for this is the end of September, or the beginning of October; but in removing them, their roots should be dug round; and all downright or strong roots, which have shot out to a great distance, be cut off, that they may have balls of earth preserved to their roots, otherwise they are liable to miscarry: and when placed in their new situations, some mulch should be laid upon the surface of the ground to prevent its drying.

The plants should likewise be supported with stakes until they have taken fast hold of the earth, to prevent their being turned out of the ground, or displaced by the winds, which destroy the fibres that are newly put out, and greatly injure the plants.

They delight in a middling soil, which is neither too wet and stiff nor too dry, though the latter is to be preferred to the former, provided it be fresh. The sorts with small leaves are commonly two years before they take root when layed: therefore they should not be disturbed, as the raising them out of the ground greatly retards their rooting.

In the seed method, the seeds should be sown in the autumn soon after they are ripe, as when they are kept out of the ground till spring they do not grow the first year. They succeed best when sown in pots or boxes filled with light loamy earth, and placed under a garden frame where they may be screened from hard frost, but always exposed to the open air in mild weather. If the seeds are sown early in the autumn, the plants appear in the spring; but if they should not come up, the pots should be plunged into the ground in an east border, where they may only have the morning sun, in which situation they should remain the following summer; during which time they may be constantly kept clean from weeds, and in the autumn removed again under a frame for shelter in winter, and the spring following the plants will certainly come up, if the seeds were good. Towards the middle of April, the pots should be again plunged into the ground on an east border, to prevent the air from drying the earth through the pots, which is generally the case when the pots stand upon the ground; so that they must then be frequently watered, which should not be practised to these plants where it can be avoided. In the autumn following the plants should be carefully taken out of the pots and planted out in a nursery-bed, covering the surface with old tan to keep out the frost; and if the winter prove severe, they should be covered with mats: afterwards they may be treated as those from layers.

These shrubs are so hardy as to thrive in the open air in this climate, and are never injured except the winters are very severe, which sometimes causes their leaves to fall, and kills a few of the weaker branches, but these are repaired by new shoots the following summer; so that there are few evergreen trees which are hardier, or that more deserve to be cultivated for the purposes of ornament.

The first and third sorts and varieties are very proper to intermix with other evergreens of the same growth, to form clumps in pleasure-grounds and parks, or to plant round the borders of woods which are filled with deciduous trees, where in the summer time their dark shades make a fine contrast with the brighter green leaves of the deciduous trees; and in winter, when the latter are destitute of leaves, they have a

fine effect. These may be trained up to stems, so as to be out of the reach of cattle, and be planted in open places, where, if they are fenced against cattle till they are grown up, they may be afterwards exposed. The others, which are of humbler growth, should be confined to gardens or other inclosures, where they may be secured from cattle, &c. They should only have the irregular branches pruned in, occasionally as they want it.

PHLOMIS, a genus containing plants of the shrubby and under-shrubby evergreen kinds.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ* or *Labiatæ*.

The characters are: that the calyx is a one-leafed perianthium, tubular, oblong, five-cornered, toothed, permanent: involucre below the whorl: the corolla one-petalled, ringent: tube oblong: upper lip ovate, vaulted, incumbent, compressed, villose, obsoletely bifid: lower lip trifid: the middle segment larger, two-lobed, blunt; the side ones small, more acute: the stamina have four filaments, concealed under the upper lip, of which two are longer: anthers oblong: the pistillum is a four-parted germ: style the length and situation of the stamens: stigma bifid, acute; the lower cleft longer: there is no pericarpium: calyx containing the seeds at the bottom: the seeds four, oblong, three-sided.

The species are: 1. *P. fruticosa*, Shrubby Phlomis, or Jerusalem Sage; 2. *P. purpurea*, Sharp-leaved Purple Phlomis; 3. *P. Italica*, Blunt-leaved Purple Phlomis; 4. *P. Lychnitis*, Sage-leaved Phlomis; 5. *P. laciniata*, Jagged-leaved Phlomis; 6. *P. tuberosa*, Tuberous Phlomis; 7. *P. Zeylanica*, White Phlomis; 8. *P. nepetifolia*, Cat-mint-leaved Phlomis; 9. *P. leonurus*, Narrow-leaved Phlomis, or Lion's-Tail; 10. *P. Leonitis*, Dwarf Shrubby Phlomis.

The first has a pretty thick shrubby stalk, covered with a loose bark, rising five or six feet in height, and dividing into many irregular branches, which are four-cornered, woolly when young, and afterwards become woody: their joints are pretty far asunder; at each of these are placed two roundish leaves opposite, on short footstalks; they are woolly on their under side: the flowers come out in thick whorls round the stalks, and are yellow; they appear from June to August; but the seeds very rarely ripen in this climate. It grows naturally in Spain and Sicily.

There are two varieties: The Narrow-leaved shrubby Phlomis, or Jerusalem Sage, which does not rise so high as the above; the branches are weaker; the leaves longer, narrower and rounder; the whorls of flowers smaller, but the flowers of the same shape and colour. These have been long cultivated under the title of French Sage, &c.

The Broad-leaved shrubby Phlomis, which has a shrubby stalk like the former, but much lower, seldom rising more than three feet and a half high, sending out branches on every side: the leaves hoary, broader than either of the former, of an oblong ovate form, on pretty long footstalks and whiter: the whorls large, with bigger flowers, the upper lip of which is very hairy.

The second species has the stem rather shrubby, erect, branched, slightly quadrangular, covered with thick wool, especially the younger branches: the leaves are opposite, ovate-oblong, obtuse, crenate, netted-veined, woolly on both sides, but most on the under one; the lowermost cut off at the base, but not heart-shaped, on long footstalks; the upper ones on shorter: the footstalks channelled, very woolly: the wool of the whole plant is formed like little stars: the whorls sessile in the axils of the upper leaves, consisting of six or eight flowers which are sessile, the same size with those of the first sort, but pale purple. It has a soapy smell, and is a native of Spain, flowering in June.

The third has the leaves less distinctly veined on the under side than in the second sort, and almost equally woolly on both sides, instead of being green on the upper; the lowermost are heart-shaped at the base: the bractes are blunt, by no means pungent; half as long as the calyx, which is also remarkably obtuse. It is a native of Italy and Portugal, flowering from June to August.

The fourth species has the habit of the first, but the leaves are narrower: the corolla is scarcely bigger than the calyx: the involucres linear, crinite with long hairs: the root is hard, thick, twisted: the leaves oblong, russet-coloured, cottony: the flowers of a golden colour, handsome, and very apparent: the bractes cordate, acuminate. It is a native of the South of France, &c., flowering from June to August.

The fifth has a perennial root: the stalk a foot and a half high which decays in the autumn, but the lower leaves continue all the year: the stem leaves are of the same shape with the lower, but smaller: the flowers in whorls: calyx downy: corolla of a dusky purple colour: they appear in June, but the seeds do not ripen in this climate. It was found in the Levant.

The sixth species has a tuberous root: the stalks are purple, four-cornered, five or six feet high: the leaves six inches long, three broad

at the base, terminating in acute points, deeply crenate on their edges: the flowers of a pale purple colour and hairy: they appear in June and July, and the seeds ripen in September; soon after which the stalks decay; but the roots abide many years. It is a native of Siberia.

The seventh species has the stem of the same stature with the ninth, two feet high, upright, herbaceous, four-cornered, blunt: the leaves sub-tomentose, marked with lines, petioled, remotely subserrate, longer than the internodes: the whorls sub-terminating with an awl-shaped involucre.

It is biennial, and a native of the East Indies, flowering from June to October.

The eighth has the stem simple, upright, quadrangular, blunt: the leaves deeply and somewhat bluntly serrate, green: the petioles the length of the leaves: the whorls few towards the top, globular, many-flowered: the calyx somewhat hairy, cylindrical, with a spiny and very sharp border, the upper tooth twice as large as the rest, and from four to six small teeth: the corolla villose, of the same appearance and colour with that of the ninth sort, but only one-third of the size; upper lip roundish, long, emarginate; lower short, trifid, even: involucre awl-shaped, reflex: filaments cohering in pairs: stigmas two, filiform, the upper shorter by half than the under. It is annual, and a native of the East Indies, flowering here in September and October.

The ninth species is a very handsome plant when it is in flower. It rises with a shrubby stalk seven or eight feet high, sending out several branches, which are four-cornered: the leaves are about three inches long, and half an inch broad, hairy on their upper side, and veined on their under: the branches have each two or three sessile whorls of flowers towards the ends: the corolla is of a tawny or golden colour, and shining like silk; upper lip long, tomentose, ciliate, quite entire; lower lip short, naked, membranaceous; the lateral segments reflex, dry, the intermediate one trifid, emarginate in the middle: the filaments snow-white: the anthers two-lobed, yellow, having globular meal sprinkled over them only at the base. It is a native of the Cape, flowering from October to December.

There is a variety of it with variegated leaves.

The tenth has the stalk shrubby, square, three feet high: branches four-cornered, in pairs: leaves rough on their upper side, veined, and pale green on their under: the corolla neither so long nor so deep coloured as in the ninth sort, to which it bears much resemblance, and is nearly allied; but the leaves are ovate, not lanceolate, and more tomentose: it differs materially from it by its awned calyxes: it agrees more with the eighth, but differs from it in having a shrubby stalk; small, blunt, more compact leaves; and the neck of the calyx rough-haired. It is a native of the Cape, flowering in June and July.

Culture.—All these plants may be increased by layers and cuttings.

The two first hardy sorts in particular grow freely by the first method: the young branches should be chosen, and laid in the common way, any time in autumn, spring, or summer; when they readily strike root, and commence proper plants by the autumn following, when they should be planted where they are to grow.

The cuttings should be made from the young shoots in spring and summer, being planted in a shady border, giving plenty of water in dry weather; when many of them will take root, and make good plants by the autumn following. The cuttings of the green-house kinds should, when made in the spring, be planted in pots, in order to be continued in shelter until May; or if the pots be plunged in a hot-bed, it will greatly forward their rooting; though, when the young shoots are planted in June or July, in a bed or border of rich earth, many of them take root, but may be much forwarded if covered down close with hand glasses, removing the glasses when the cuttings begin to shoot.

The fifth may likewise be increased by slips planted at the same time; and the sixth by offsets. The seventh should be preserved in the bark stove.

They are all very ornamental plants in the borders, green-house, and stove collections, according to the kinds.

PHLOX, a genus comprising plants of the herbaceous, fibrous-rooted, flowery, perennial kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Rotaceæ*.

The characters are: that the calyx is a one-leafed perianthium, cylindrical, ten-cornered, five-toothed, acute, permanent: the corolla one-petalled, salver-shaped: tube cylindrical, longer than the calyx, narrower below, curved in: border flat, five-parted: segments equal, blunt, shorter than the tube: the stamina have five filaments, within the tube of the corolla, two longer, one shorter: anthers in the throat of the corolla: the pistillum is a conical germ: style filiform, the length of the stamens: stigma trifid, acute: the pericarpium is an ovate capsule, three-cornered, three-celled, three-valved: the seeds solitary, ovate.

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1 *Phlox paniculata* Panicled Lychnidea

2 *Polygala chamæ buxus* Box leaved Milkwort

3 *Physalis alkakengi* Winter Cherry

The species are: 1. *P. paniculata*, Panicled Lychnidea; 2. *P. suaveolens*, White-flowered Lychnidea; 3. *P. maculata*, Spotted-stalked Lychnidea; 4. *P. pilosa*, Hairy-leaved Lychnidea; 5. *P. Carolina*, Carolina Lychnidea; 6 *P. glaberrima*, Smooth Lychnidea; 7. *P. divaricata*, Early-flowering Lychnidea.

The first has the stalk smooth, of a light green, about two feet high, sending out a few side branches: the leaves are near three inches long, and one broad in the middle, of a dark green, and sessile: the flowers in a terminating corymb, composed of many smaller bunches, which have each a distinct footstalk, and support a great number of flowers, which stand on short slender pedicels: the calyx short, cut almost to the bottom into five narrow acute segments: the corolla is pale purple, appearing late in July, and often followed by seeds which ripen in autumn. It is a native of North America, flowering in August and September.

The second species has white flowers, moderately sweet-scented. It is a native of North America, flowering in July and August.

The third has upright stalks, of a purplish colour, closely covered with white spots, and about three feet high: the leaves about three inches long, and one broad at their base, ending in acute points. Towards the upper part of the stalks are small branches opposite, each terminated by a small bunch of flowers; but on the top of the principal stalk is a long loose spike of flowers, composed of small bunches from the axils at each joint; each cluster having one common peduncle near an inch long, but the pedicels are short. The flowers are of a bright purple colour, and appear late in July: if the season be temperate, or the soil moist, they continue in beauty a great part of August, but rarely perfect seeds in this climate. It is a native of North America, flowering in August.

The fourth species has the stalks about a foot high: the leaves narrow-lanceolate, ending in acute points, sessile, a little hairy: the calyx cut into acute segments almost to the bottom: the tube of the corolla slender and pretty long, cut at top into five ovate spreading segments: the flowers light purple, appearing at the end of June, but seldom producing seeds in this climate. It is a native of North America.

The fifth resembles the sixth, but the stem is three times as high, and somewhat rugged: the leaves wider, and ovate-lanceolate: the corymb consisting of numerous flowers, with several peduncles from the uppermost axils of the leaves, erect, and fastigiate into a sort of corymb of a dark purple colour. It grows naturally in Carolina, flowering from July to September.

The sixth species has the stalks near a foot and half high, dividing into three or four small branches towards the top, each terminated by a corymb of flowers: the lower leaves opposite, three inches long, and near half an inch broad at the base, ending in long acute points, smooth and sessile; the upper ones are alternate: the tube of the corolla twice the length of the calyx; segments of the border roundish, spreading, of a light purple colour: the flowers appear in June, but seldom produce seeds in this climate. It is a native of North America, flowering from June to August.

The seventh species has the stems almost upright, simple, and then divided into two branches: the leaves opposite on a simple stem, in five oppositions, softish, rugged; the upper ones alternate: the flowers from the partings of the stem and the axils of the alternate leaves, two together on separate pedicels: the calyx five-parted: the corollas pale blue, with a crooked tube: the flowers appear at the end of May, or beginning of June, but are rarely succeeded by seeds in this climate. It grows naturally in North America.

Culture.—These are generally increased by parting their roots, as they do not often produce seeds in this climate. The best time for performing this is in autumn, when the stalks begin to decay. The roots should not, however, be divided into too small heads, when they are expected to flower well the following summer; nor should they be parted oftener than every other year, as, when they are too often removed and parted, it greatly weakens the roots, so that they send out but few stalks, and those so weak as not to rise their usual height, and the bunches of flowers are much smaller.

The large root off-sets may be planted out at once where they are to remain; but the small ones in nursery-rows, for further increase in size.

When the roots are parted and removed, it is a good way to lay some old tan, or mulch, upon the surface of the ground about their roots, to prevent the frost from penetrating; for, as they will have put out new roots before winter, the frost, when it is severe, often kills the fibres, whereby the plants suffer greatly, and are sometimes wholly destroyed.

The first and sixth sorts may be increased pretty expeditiously by their spreading roots, but the others but slowly this way; of course it is a better method to have recourse to cuttings. The best season for planting the cuttings is about the end of April, or the beginning of the following month, when the young shoots from the roots, which are about two inches high, should

be cut off close to the ground, and their tops shortened, being then planted on a border of light loamy earth, and shaded from the sun until they have taken root; or if they are planted pretty close together, and covered with bell- or hand-glasses, or in pots, shading them every day from the sun, they will put out roots in five or six weeks; but on their beginning to shoot, the glasses should be gradually raised to admit the free air to them, otherwise they are apt to draw up weak, and soon spoil: as soon as they are well rooted, the glasses should be taken off, and the plants inured to the open air; being soon afterwards removed into a bed of good soil, planting them about six inches distance every way, shading them from the sun, and watering till they have taken new root; after which, when kept clean from weeds, they require no other care till autumn, when they should be removed into the borders or other parts, where they are designed to remain.

When some of the plants are put into pots, and sheltered under a hot-bed frame in winter, they flower stronger the following summer.

These plants succeed best in a moist rich mellow soil, growing taller, and flowering more strongly and in larger bunches. In poor dry soils they often die during the summer, when not constantly watered with care.

Some of the plants afford ornament in the borders, clumps, and other parts of pleasure-grounds; and those planted in pots to be placed in court-yards, or other places near the habitation, when they are in beauty, and being mixed with other flowers, are highly ornamental.

PHŒNIX, a genus containing a plant of the evergreen exotic tree kind.

It belongs to *Appendix Palmæ*, (*Dioecia Triandria*,) and ranks in the natural order of *Palmæ*, or *Palms*.

The characters are: that in the male flowers the calyx is an universal one-valved spathe: spadix branched: perianthium three-parted, very small, permanent: the corolla has three petals, concave, ovate, somewhat oblong: the stamina have three very short filaments: anthers linear, four-cornered, the length of the corolla: female flowers on a different plant, or on the same spadix: the calyx as in the male: the pistillum is a roundish germ: style awl-shaped, short: stigma acute: the pericarpium is an ovate, one-celled drupe: the seed single, bony, subovate, with a longitudinal groove.

The species is *P. dactylifera*, Date Palm-tree.

It rises to a great height in warm climates: the stalks are generally full of rugged knots, which are the vestiges of the decayed leaves, for the trunks of these trees are not solid like other trees, but the centre is filled with pith, round which is a tough bark full of strong fibres while young, but as the trees grow old, this bark hardens and becomes woody: to it the leaves are closely joined, and in the centre rise erect, being closely folded or plaited together; but after they are advanced above the sheath which surrounds them, they expand very widely on every side the stem, and as the older leaves decay the stalk advances in height: the leaves when grown to a size for bearing fruit are six or eight feet long, and may be termed branches (for the trees have no other); these have narrow long leaves (or pinnæ) set on alternately their whole length: the small leaves or lobes are towards the base three feet long, and little more than one inch broad; they are closely folded together when they first appear, and are wrapped round by brown fibres or threads, which fall off as the leaves advance, making way for them to expand; these never open flat, but are hollow like the keel of a boat, with a sharp ridge on their back; are very stiff, and, when young, of a bright green, ending with a sharp black spine. These trees have male flowers on different plants from those which produce the fruit, and there is a necessity for some of the male trees to grow near the females, to render them fruitful; or at least to impregnate the germ, without which the stones which are taken out of the fruit will not grow: the flowers of both sexes come out in very long bunches from the trunk between the leaves, and are covered with a spatha (or sheath) which opens and withers; those of the male have six short stamina, with narrow four-cornered anthers filled with farina. The female flowers have no stamina, but have a roundish germ, which afterwards becomes an oval berry, with a thick pulp inclosing a hard oblong stone, with a deep furrow running longitudinally: the bunches of fruit are sometimes very large. It is a native of the Levant.

Culture.—This plant may be increased by seed, procured from abroad, or taken out of the fruit, which should be sown as soon as possible in pots of light rich earth, plunging them in a tan hot-bed, or in the bark-bed in the stove, giving moderate waterings; when they soon come up; and when a few inches high, they should be pricked out into separate small pots, plunging them in the hot-bed or bark-bed; where they must remain, giving frequent waterings, and shifting them into larger pots, according as their progress of growth may require. When they are removed, great care should be taken not to injure their large roots, or to over-pot them.

This, like the rest of the Palm tribe, has no other branches than its large leaves, each of which is composed of a leaf and branch, always arising from the top; and as the old leaves fall, the stem forms itself and advances in height; but although the leaves grow very tall in a few years, the stem advances but slowly, and can never be expected to arrive at a flowering and fruiting state in this climate: it, however, merits a place in the hot-house collections for its singularity.

The berries of this tree are the dates of the shops, which are imported from Africa and the countries in the Levant.

PHYLICA, a genus containing plants of the shrubby, evergreen, exotic kind. Bastard Alaternus.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Dumosæ*.

The characters are: that the calyx is a common receptacle of the fructifications collecting the flowers into a disk: perianthium proper one-leafed, five-cleft, turbinate, mouth villose, permanent: there is no corolla: scalelets five, acuminate, one at the base of each division of the calyx, converging: the stamina have five filaments, very small, inserted under the scalelet: anthers simple: the pistillum is a germ at the bottom of the corolla: style simple: stigma obtuse: the pericarpium is a roundish capsule, three-grained, three-celled, three-valved, crowned: the seeds solitary, roundish, gibbous on one side, angular on the other.

The species are: 1. *P. ericoides*, Heath-leaved Phylica; 2. *P. plumosa*, Woolly-leaved Phylica; 3. *P. buxifolia*, Box-leaved Phylica.

The first is a low bushy plant, seldom rising more than three feet high: the stalks are shrubby and irregular, dividing into many spreading branches, subdividing into smaller ones: the young branches are closely beset with short, narrow, acute-pointed, sessile leaves, of a dark green, and continuing all the year. At the end of every shoot, the flowers are produced in small clusters sitting close to the leaves; they are of a pure white, begin to appear in the autumn, continue in beauty all winter, and decay in spring. It grows naturally at the Cape, and the flowers are slightly odoriferous.

The second species has an erect shrubby stalk, which rises near three feet high, covered with a purplish bark, and here and there some white down upon it: the leaves are narrow, short, acute-pointed, sessile, alternate on every side, thick, nerved, dark green on their upper surface, but hoary on their under: flowers collected in small heads at the end of the branches, white, woolly, fringed on their borders, cut into six acute segments at top. It flowers from March to May.

The third rises with a shrubby upright stalk five or six feet high, when old covered with a rough purplish bark, but the younger branches have a woolly down: the leaves are thick, the size of those of the box-tree, veined, smooth and of a lucid green on their upper side, but hoary on their under; they have short footstalks, and stand without order on the branches: the flowers are collected in small heads at the ends of the branches; they are of an herbaceous colour, and make no great appearance. It flowers during a great part of the year.

Culture.—They are chiefly increased by cuttings and slips of the young shoots.

In spring, as about March or April, a quantity of young cuttings, or slips of the small shoots, should be taken off, planting them in pots of rich earth, plunging them in a hot-bed, or in the bark-bed in the stove; giving frequent waterings, and occasional shade from the sun, when they will soon emit roots, and become proper plants fit for potting off separately in autumn: or the young cuttings or slips may be planted any time in summer, particularly in June and July, in pots as above, and placed under a hot-bed frame, or covered close with hand glasses, being watered and shaded; when they will also grow, but not be so forward as those of the spring planting.

They are somewhat tender plants, requiring shelter in winter in this climate: of course they must always be kept in pots, and placed among the green-house exotics, where they will effect a very agreeable variety at all seasons, and flower annually a great part of the autumn and winter, but do not produce seed in this climate.

PHYLLANTHUS, a genus furnishing plants of the evergreen exotic tree and shrubby kind. Sea-side Laurel.

It belongs to the class and order *Monoecia Triandria*, and ranks in the natural order of *Tricoccæ*.

The characters are: that the male calyx is a one-leafed perianthium, six-parted, bell-shaped, coloured: segments ovate, spreading, blunt, permanent: there is no corolla, except the calyx be called so: the stamina have three filaments, shorter than the calyx, approximating at the base, distant at the tips: anthers twin: females—the calyx a perianthium as in the males: there is no corolla: nectary a rim of twelve angles, surrounding the germ: the pistillum is a roundish germ, obtusely three-cornered: styles three, spreading, bifid: stigmas blunt: the pericarpium is a roundish capsule, three-grooved, three-celled;

cells bivalve: the seeds are solitary and roundish.

The species are: 1. *P. Niruri*, Annual Phyllanthus; 2. *P. grandifolia* Great-leaved Phyllanthus; 3. *P. Emblica*, Shrubby Phyllanthus.

The first has a filiform, long, white root: the stem herbaceous, about a foot high, branched, erect, roundish, even: the leaves alternate, distant, often only terminating: the petioles filiform, bearing both leaves and flowers: the leaflets contract every evening, turning their under side outwards: the flowers are produced on the under side of the leaves along the midrib, and turn downwards. It usually flowers here from June to October. It is common in Barbadoes.

The second species rises with a tree-like stem and branches: the leaves are large, ovate, obtuse, and entire. It is a native of North America.

The third rises in its native situation, with a tree-like stem, to the height of twelve or fourteen feet, but in this climate not more than half that height, sending out from the side many patulous branches: the leaves have very narrow leaflets. It has a berry-like fruit, and is a native of the Indies.

Culture.—These plants, where seeds can be procured from their native situations, may be raised in that way. They should be sown in pots filled with light earth, and plunged in a hot-bed; and when the plants have acquired some growth, they should be planted out into separate pots filled with the same sort of mould; being replunged in the hot-bed, due shade and water being given, until they become perfectly rooted; after which they should be constantly kept in the bark-bed of the stove, and have the management of other plants of the same tender sort.

They may also sometimes be raised by planting out slips, or by layers managed in the same way as those from seeds.

They afford a fine variety in their beautiful foliage, and the flowery kinds have a singular effect in their flowers.

PHYLLIS, a genus containing plants of the shrubby evergreen exotic kind.

It belongs to the class and order *Pentandria Digynia*, snd ranks in the natural order of *Stellatæ*.

The characters are: that the calyx has no umbel (but a panicle): perianthium very small, superior, two-leaved, obsolete: the corolla has five petals, lanceolate, obtuse, revolute, scarcely connected at the base: the stamina have five filaments, shorter than the corolla, capillary, flaccid: anthers simple, oblong: the pistillum is an inferior germ: style none: stigmas two, awl-shaped, pubescent, reflex: there is no pericarpium: fruit turbinate-oblong, blunt, angular: the seeds two, parallel, convex and angular on one side, flat on the other, wider at top.

The species is *P. Nobla*, Bastard Hare's-Ear.

It rises with a soft shrubby stalk about two or three feet high, which is seldom thicker than a man's finger, of an herbaceous colour, and full of joints. These send out several small side branches towards the top, garnished with spear-shaped leaves near four inches long, and almost two broad in the middle, drawing to a point at each end; they are of a lucid green on their upper side, but pale on their under, having a strong whitish midrib, with several deep veins running from it to the sides: the leaves are for the most part placed by threes round the branches, to which they sit close: the flowers are produced at the ends of the branches, in loose panicles; are small, of an herbaceous colour at their first appearance, but before they fade, change to a brown or worn out purple, and are cut into five parts to their base, where they are connected, and fall off without separating. It is a native of the Canary Islands, flowering in June and July.

Culture.—The plants may be increased by sowing the seeds in the early spring months, as about March, in pots filled with light earth, and plunged in a hot-bed; and when the plants have attained some growth, they should be planted out in separate pots, replunging them in the hot-bed, due shade being given till they become well rooted. In the summer season they should be set out in a sheltered situation, so as to have the morning sun, and be frequently watered. In the winter they must be well sheltered from frost, but have as much air as possible in mild weather,

In the second year, when the plants are shaken out of the pots and placed in a proper situation in the open ground, they flower better and afford more perfect seeds than when kept in pots.

They may also be raised by cuttings planted out in the summer season.

New plants should be raised every two or three years, as they do not last long.

They afford an agreeable variety among other evergreen plants of the green-house kind.

PHYSALIS, a genus comprising plants of the herbaceous and shrubby ornamental kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Luridæ*.

The characters are: that the calyx is a one-leafed perianthium, ventricose, half-five-cleft,

small, five-cornered, with acuminate segments, permanent: the corolla one-petalled, wheel-shaped: tube very short: border half-five-cleft, large, plaited: segments wide, acute: the stamina have five filaments, awl-shaped, very small, converging: anthers erect, converging: the pistillum is a roundish germ: style filiform, generally longer than the stamens: stigma blunt: the pericarpium is a subglobular berry, two-celled, small, within a very large, inflated, closed, five-cornered, coloured calyx: the receptacle kidney-form, doubled: the seeds very many, kidney-form, compressed.

The species are: 1. *P. angulata*, Tooth-leaved Winter Cherry; 2. *P. pubescens*, Woolly Winter Cherry; 3. *P. Alkekengi*, Common Winter Cherry; 4. *P. Pensylvanica*, Pennsylvanian Winter Cherry; 5. *P. viscosa*, Clammy Winter Cherry; 6. *P. somnifera*, Clustered Winter Cherry; 7. *P. flexuosa*, Flexuous Italian Winter Cherry; 8. *P. arborescens*, Tree-like Physalis, or Winter Cherry; 9. *P. Curassavica*, Curassavian Winter Cherry.

The first has a staight stem, the thickness of the little finger, about a foot high, three-cornered below, four-cornered above, as are also the branches, which come out obliquely from top to bottom, in alternate order, and are thicker at the base: the lower leaves wider and rounder than those about the middle of the stem, and these larger than those of the branches, deeply toothed or jagged: the flowers five-cornered, of an extremely pale yellow colour, with spots of a darker yellow at the base. It is a native of both the Indies, &c.

There is a variety which is taller, with entire leaves, smaller flowers of a paler yellow colour.

The second species branches out very wide close to the ground, and the branches frequently lie upon it; they are angular and full of joints, dividing again into smaller branches: the leaves are on pretty long footstalks, about three inches long and almost two broad, having several acute indentures on their edges: the flowers produced on the side of the branches upon short, slender, nodding peduncles; they are of an herbaceous yellow colour with dark bottoms, and are succeeded by large, swelling bladders; of a light green, inclosing berries as large as common cherries, which are yellowish when ripe. It flowers in July, and is a native of Virginia.

These are both annual plants.

The third has perennial roots, creeping to a great distance: they shoot up many stalks in the spring a foot high or more: the leaves of various shapes, some angular and obtuse, others oblong and acute-pointed, of a dark green, on long footstalks: the flowers axillary, on slender peduncles, white, appearing in July; the berry round, the size of a small cherry, inclosed in the inflated calyx, which turns of a deep red in the autumn. It is a native of the South of Europe, &c.

The fourth species has many procumbent or erect stems, scarcely a foot in height, somewhat flexuose, roundish or obscurely angular on the top, at the flowers branched, having an obscure down scattered over them: the leaves are alternate, ovate, blunt, serrate-repand, almost naked above, obscurely tomentose underneath, next the flowers in pairs: the flowers axillary on very short peduncles, larger than those of the common sort, and of a pale yellow colour. They are succeeded by very small yellowish berries, which ripen in the autumn when the season proves warm. It is a native of North America, and flowers from July to September.

The fifth has a creeping root, sending up a great number of smooth stalks, about a foot high, dividing towards the top into small spreading branches: the leaves heart-shaped or ovate, about three inches long, and two broad near their base, entire, rough to the touch, of a pale yellowish green, alternate, on pretty long footstalks: the flowers are towards the top, axillary, on long slender peduncles, of a dirty yellow colour with purple bottoms. They appear in June and July, and are succeeded by viscous berries about the size of the common sort, of an herbaceous yellow colour, inclosed in a light-green swelling bladder. It is a native of America.

The sixth species rises with a shrubby stalk, near three feet high, dividing into several branches which grow erect, and are covered with a woolly down: the leaves ovate-lanceolate, almost three inches long, and an inch and a half broad in the middle, downy, and on short petioles: the flowers small, of an herbaceous white colour, sitting very close to the branches, and succeeded by small berries nearly of the same size as the common winter cherry, and red when ripe. It is a native of Spain, Sicily, &c., flowering in July and August.

The seventh rises to the height of five or six feet, sending out long flexuose branches covered with a gray bark: the leaves oblong-ovate, often placed opposite, sometimes by threes round the branches, to which they sit close: the flowers in clusters at the base of the petioles, small, of an herbaceous yellow colour: they are succeeded by round purplish berries having ten cells, each including one seed. It flowers in July and August, but not unless the season is warm. It is a native of the East Indies.

The eighth species has a shrubby stalk,

ten or twelve feet high, dividing towards the top into several small branches, covered with a gray hairy bark: leaves on the lower part alternate, but towards the end of the branches opposite; the lower leaves from three to four inches long, and two broad in the middle, drawing to a point at both ends; they are of a pale green, and downy: the flowers from the axils towards the end of the branches, one or two at the same joint opposite, on short nodding peduncles; are small, of a pale dirty yellow colour, with purple bottoms: berries small, spherical, red, inclosed in an oval dark-purple bladder. It flowers in June and July.

The ninth has a perennial creeping root: the stalks several, slender, about a foot high, becoming somewhat woody, but seldom lasting above two years; the leaves alternate, on short footstalks; they are about two inches long, and an inch and half broad: the flowers axillary towards the top, on short slender peduncles: petals small, sulphur-coloured with dark-purple bottoms: they appear in July and August, but are rarely succeeded by berries in this climate. It is a native of Curassao in the West Indies.

Culture.—These plants are all capable of being increased by seeds; the second, third, fourth, and fifth sorts, also by parting the roots; the sixth, seventh, eighth, and ninth, likewise by cuttings.

In the first sort, the seed should be sown in the early spring, as April, in pots of light earth, plunging them in a moderate hot-bed. When the plants have acquired a few inches in growth they should be removed into separate pots, gradually inuring them to the open air, in order that they may be removed with balls into the clumps or borders. But it is probably a better method to sow them in the latter end of May, in the places where they are to remain, as they do not bear transplanting well.

They must be raised annually.

In the herbaceous kinds the seeds should be sown in the autumn as soon as they are ripe, or early in the spring, in the beds, borders, or clumps where they are to remain; or they may be transplanted into other beds to remain till the following autumn, when they may be removed to the situations where they are to remain.

The roots may be parted either in the early autumn or spring season, when the weather is mild. The divided parts should have root-fibres left at the bottoms and a bud in each at the tops in order to their succeeding properly.

In the sixth and seventh sorts, the seed should be sown in pots of light mould in the early spring and plunged in a mild hot-bed. When the plants have had a little growth they should be pricked out into separate small pots, proper shade and water being given; being afterwards managed as the shrubby exotics of less tender plants.

They may likewise be raised from cuttings made in the later spring or summer months, which should be placed in pots of light mould and plunged in the hot-bed, due shade and water being given till they have stricken root.

And the two last sorts may be raised from seeds or cuttings in the same way, by the aid of the bark hot-bed of the stove.

The first and the other herbaceous sorts are curious ornamental plants in the borders, clumps, and other parts of pleasure-grounds, and the four best shrubby sorts in the green-house and stove collections.

PHYTOLACCA, a genus affording plants of the herbaceous hardy kinds.

It belongs to the class and order *Decandria Decagynia*, and ranks in the natural order of *Miscellaneæ*.

The characters are: that there is no calyx, unless the corolla be called a coloured calyx: the corolla five petals, roundish, concave, spreading, bent in at top, permanent: the stamina have eight, ten, or twenty, awl-shaped filaments, the length of the corolla: anthers roundish, lateral: the pistillum is an orbiculate germ, depressed, divided externally by swellings, ending in eight or ten very short spreading-reflex styles: the pericarpium is an orbiculate berry, depressed, marked with ten longitudinal grooves, umbilicated with the pistils, and having as many cells: the seeds are solitary, kidney-form and smooth.

The species cultivated are: 1. *P. octandra*, White-flowered Phytolacca; 2. *P. decandra*, Branching Phytolacca, or Virginian Poke; 3. *P. icosandra*, Red Phytolacca; 4. *P. dioica*, Tree Phytolacca.

The first has the stalk herbaceous, two feet high, about the size of a man's finger, and divides at top into two or three short branches: the leaves ovate-lanceolate, near six inches long, and almost three broad; they have a strong midrib, and several transverse veins, are of a deep green, and the footstalks are an inch and half long: the peduncles come out from the side of the branches opposite to the leaves, are seven or eight inches long; the lower part, about two inches in length, is naked; the remainder has sessile flowers, white with a blush of purple in the middle, cut into five segments almost to the bottom, and having from eight to fourteen stamens, and ten styles: the berries flat, with ten deep furrows.

In some places it is found a palatable wholesome green: the tender stalks are frequently served up for young asparagus.

In the second species the root is very thick and fleshy, as large as a man's leg, divided into several thick fleshy branches, which run deep in the ground: the stems three or four, herbaceous, as large as a good walking-stick, of a purple colour, six or seven feet high, dividing into many branches at the top: the leaves five inches long, and two inches and a half broad, rounded at their base, but terminating in a point, placed without order on short footstalks; they are of a deep green, and in the autumn change to a purplish colour: the peduncles come out from the joints and divisions of the branches, and are about five inches long; the lower part is naked, but the upper half sustains a number of flowers ranged on each side like common currants. Each flower stands upon a pedicel half an inch long, and the petals are purplish: the berry depressed, with ten furrows. It flowers in July and August. It is a native of Switzerland, &c.

In some places the young shoots are boiled and eaten as spinach.

The third rises with an herbaceous stalk, from two to three feet high, with several longitudinal furrows, and changes at the end of summer to purple. It divides at top into three or four branches: the leaves are lanceolate, six or seven inches long, and almost three broad in the middle, of a deep green, on short footstalks; some are alternate, others opposite, and they are frequently oblique to the footstalk: the peduncles come out from the side of the branches opposite to the leaves; they are nine or ten inches long, the lower part being naked, but for a shorter space than in the other sorts; the upper part narrow and commonly inclined: the flowers are larger, white within, of an herbaceous colour on their edges, and purplish on the outside, on short pedicels.

The fruit is a globular berry. It is annual.

The fourth is a shrub two fathoms in height: the stem upright, a little branched, very thick, gray: the leaves scattered, oblong-ovate, acuminate, entire, smooth, flat or ascending on the sides, five inches long, and two inches and a half wide: the petioles spreading, cylindrical, reddish, equal to half the leaf in length: the racemes terminating, peduncled, solitary, pendulous, bracteate, six inches long: the flowers scattered, pedicelled, spreading very much, whitish green: the males five or six lines in breadth, the females smaller by half. Both the male and the female plants flower every spring, but the latter is probably barren. It is a native of South America.

Culture.—The three first sorts may be increased by seeds, which should be sown in pots, in the spring, and plunged in a moderate hot-bed: when the plants have had a few inches growth, they should be removed into separate pots in the first and third sorts, but in the second into the borders or other parts, allowing them good room. The two former may be set out in warm borders or other places during the summer in the pots, being carefully watered, shaded, and kept free from weeds.

The fourth sort may be raised by planting cuttings in the summer season, in pots filled with light earth, plunging them in the bark hot-bed and covering the pots with hand glasses, proper shade being given. When well rooted, they should be removed into separate pots of a small size, re-plunging them in the hot-bed with proper shade till rooted, when they should be gradually inured to the open air, being removed into a moderate stove during the winter season.

They afford ornament and variety among potted plants of the stove kind; and the second sort, in the borders of the natural ground.

PIGEON PEA. See CYTISUS.

PIG-NUT. See BUNIUM.

PILEWORT. See RANUNCULUS.

PIMENTO. See MYRTUS.

PIMPERNEL. See ANAGALLIS.

PIMPINELLA, a genus containing a plant of the annual kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ* or *Umbelliferæ*.

The characters are: that the calyx is an universal umbel of many rays: partial of still more: involucre universal none: partial none: perianthium proper scarcely observable: the corolla universal almost uniform: florets all fertile: proper, petals five, inflex-cordate, almost equal: the stamina have five filaments, simple, longer than the corolet: anthers roundish: the pistillum is an inferior germ: styles two, very short: stigmas subglobular: there is no pericarpium: fruit ovate-oblong, bipartile: the seeds two, oblong, narrower towards the top, on one side convex and striated, on the other flat.

The species cultivated is *P. Anisum*, Anise.

It has an annual root: the lower leaves are divided into three lobes, which are deeply cut on their edges: the stem a foot and half high, dividing into several slender branches, which have narrow leaves on them, cut into three or four narrow segments: the umbels pretty large and

loose, on long peduncles: the flowers small, yellowish white: the seeds oblong, swelling. It flowers in July; and if the season prove warm the seeds will ripen in autumn. It is a native of Egypt.

The seeds have an aromatic smell, and a pleasant warm taste, accompanied wish a considerable degree of sweetness.

Culture.—The seeds should be sown in the early part of April on a dry warm border, where the plants are to remain, being afterwards properly thinned out and kept free from weeds. These plants, however, seldom afford much profit by their seeds in this climate.

They produce variety in the borders, &c., of pleasure-grounds, as well as in pots in other places when cultivated in that way.

PINASTER. See PINUS.

PINEA. See PINUS.

PINE-APPLE. See BROMELIA.

PINE, SCREW. See PANDANUS.

PINE-TREE. See PINUS.

PINGUIN. See BROMELIA.

PINUS, a genus containing plants of the evergreen and deciduous tree-kinds.

It belongs to the class and order *Monoecia Monadelphia*, and ranks in the natural order of *Coniferæ*.

The characters are: that the male flowers are disposed in racemes: the calyx has scales of the bud opening, and no other: there is no corolla: the stamina have very many filaments, connected at bottom into an upright column, divided at top: anthers erect, naked: female flowers on the same plant: calyx is a subovate strobile, consisting of scales which are two-flowered, oblong, imbricate, permanent, rigid: there is no corolla: the pistillum is a very small germ: style awl-shaped: stigma simple: there is no pericarpium: strobile serves for a calyx, having before been closed, but now only converging: the seed is a nut augmented by a membranaceous wing which is larger than the seed, but less than the scale of the strobile, oblong, straight on one side, gibbous on the other.

The species are: 1. *P. sylvestris*, Wild Pine-Tree; 2. *P. Pinaster*, Pinaster, or Cluster Pine-Tree; 3. *P. inops*, Jersey Pine-Tree; 4. *P. resinosa*, American Pitch Pine-Tree; 5. *P. halepensis*, Aleppo Pine-Tree; 6. *P. Pinea*, Stone Pine-Tree; 7. *P. Tæda*, Torch Pine, or Three-leaved Virginia Pine; 8. *P. palustris*, Swamp Pine-Tree; 9. *P. cembra*, Siberian Stone Pine-Tree; 10. *P. occidentalis*, West Indian Pine-Tree; 11. *P. Strobus*, Weymouth Pine-Tree; 12. *P. Cedrus*, Cedar of Lebanon; 13. *P. pendula*, Black Larch-Tree; 14. *P. Larix*, Common White Larch-Tree; 15. *P. Picea*, Silver Fir-Tree; 16. *P. Balsamea*, Balm of Gilead Fir-Tree; 17. *P. canadensis*, Hemlock Spruce Fir-Tree; 18. *P. nigra*, Black Spruce Fir-Tree; 19. *P. Abies*, Norway Spruce Fir-Tree; 20. *P. alba*, White Spruce Fir-Tree; 21. *P. orientalis*, Oriental Fir-Tree.

The first in a favourable soil grows to the height of eighty feet, with a straight trunk: the bark is of a brownish colour and full of crevices: the leaves issue from a white truncated little sheath in pairs; they are linear, acuminate, quite entire, striated, convex on one side, flat on the other, mucronate, bright green, smooth, from an inch and half to two inches or a little more in length, shorter than in the Pinaster and Stone-Pine, broader, twisted, and of a grayish colour: the scales of the male catkins roll back at top, and are feathered; the inner and upper scales of the cones gradually terminate in a short awn, but the lower scales have none; the scales open very readily; the cones small, pyramidal, ending in narrow points, of a light colour, with small seeds. It is here often called Scotch Fir, from its growing naturally in the mountains of Scotland; but is common in most parts of Europe, particularly in the northern parts. The wood affords the red or yellow deal, which is the most durable of any of the kinds yet known: the leaves are much shorter than those of the Pinaster and Stone Pine, broader, of a grayish colour and twisted: the cones are small, pyramidal, and end in narrow points; they are of a light colour, and the seeds are small.

The trunk affords masts to our navy, and from it and the branches tar and pitch are obtained, as also by incision barras, Burgundy pitch and turpentine.

There are several varieties: as the Tartarian, which has a great resemblance to it, but the leaves are broader, shorter, and their points are more obtuse; they emit a strong balsamic odour when bruised: the cones are very small, as are also the seeds, some of which are black, and others white. It grows naturally in Tartary.

The Mountain, or Mughoe, which has very narrow green leaves, grows sometimes by pairs, sometimes by threes from the same sheath, generally standing erect: the cones are of a middling size and pyramidal: the scales flat, having each a small obtuse rising, but very compact till they are opened by the warmth of the sun the second spring: the seeds of this are much less than those of the second sort, but larger than those of the first. It is a native of the Swiss mountains, where it is often called Torch Pine, growing to a great height.

The Sea Pine, which has smooth leaves: the cones are very long and slender; and the seeds are about the same size with those of the second species. It grows in the maritime parts of Italy, &c.

Others are likewise mentioned by writers.

The second species grows to a large size: the branches extend on every side to a considerable distance, and whilst the trees are young, they are fully furnished with leaves, especially when they are not so close as to exclude the air from those within; but as they advance in age the branches appear naked, and all those which are situated below become unsightly; for this reason, and because the timber is much preferable to it, the first species has been more generally cultivated. Its branches grow at a wider distance than those of the first sort, and are more horizontal: the leaves much larger, thicker, and longer, grow straight, have a broad surface on their inside, which has a furrow or channel running longitudinally; they are of a darker green and their points obtuse: the cones are seven or eight inches long, pyramidal, with pointed scales: the seeds oblong, a little flatted on their sides, and have narrower wings on their tops. It grows naturally in the mountains of Italy, &c.

The third never rises to any great height, and is the least esteemed in the country of all the sorts. While the trees are young they make a pretty good appearance, but when they get to the height of seven or eight feet they become ragged and unsightly, and are seldom worth cultivating in this climate. It is a native of North America.

The fourth species is also a native of North America, and may be cultivated in this climate.

The fifth species branches out on every side near the root; they at first grow horizontally, but turn their ends upwards; their bark is smooth and of a dark gray colour: the leaves are long and very narrow, of a dark green, and if they are bruised emit a strong resinous odour: the cones come out from the side of the branches; are not much more than half the length of those of the second species, but are full as large at their base: the scales are flatted, and the point of the cones obtuse: the seeds much less, but of the same shape. It is a native of Aleppo, &c.

The sixth has the leaves not quite so long as those of the second species, and of a grayish or sea-green colour: the cones are not more than five inches long, but very thick, roundish, and end obtusely: the scales are flat, and the seeds more than twice the size of those of the second sort: the kernels are frequently served up in deserts during the winter season in Italy and the South of France.

It grows to a considerable height, with a straight and fair stem, but rough bark: the leaves contribute to diversify the scene in plantations, as they differ in colour from the other sorts, and are arranged in a different manner: the cones are very large and turbinate, striking the eye by their bold appearance when hanging on the trees; and when closely examined, afford ornament from the beautiful arrangement of their scales. It is a native of the South of France, &c., is chiefly grown for ornament and the kernels which it affords.

The seventh has very long narrow leaves, growing by threes out of each sheath: the cones are as large as those of the sixth sort, but more pointed, and the scales looser, opening horizontally and discharging the seeds. The wood of this tree is like that of the first sort, but has more resin. It is a native of North America, and is cultivated under the name of Frankincense Pine.

There are different varieties; as the Three-leaved Virginia, which has the leaves long, generally three in each sheath: the cones in clusters round the branches, as long as those of the second sort, but with rigid scales: the seeds also nearly as large as those of it. It grows naturally in Virginia, and other parts of North America, where it rises to a great height.

The others differ but little from this.

The eighth species, in its native swampy situation, grows to the height of twenty-five or thirty feet: the leaves are a foot or more in length, growing in tufts at the ends of the branches, having a singular appearance. The wood is of little use but for fuel. It is a native of Carolina and Georgia.

The ninth is often confounded with the sixth sort; but the cones of the latter are short and roundish, with close scales, whereas those of it are long and the scales looser: the leaves have a near resemblance; but the plants raised from seeds of that sort make much greater progress than this, which can scarcely be kept alive in this climate. It is a native of Switzerland, Siberia, &c.

The tenth species has been confounded with the eleventh sort, and is a native of Hispaniola.

The eleventh is one of the tallest species, often attaining a hundred feet in height in its native country: the bark is very smooth and delicate, especially whilst the tree is young: the leaves are long and slender; they are pretty closely placed on the branches, and make a fine

appearance: the cones are long, slender, and very loose, opening with the first warmth of the spring; so that if the seeds are not gathered in winter, the scales open and let them out: the wood is esteemed for masts of ships. It is often called the White and New England Pine, and is highly ornamental.

The twelfth species is a noble tree, which has a general striking character of growth so peculiar to itself that no other tree can possibly be mistaken for it. It is placed with the Larch, in the genus with Firs and Pines, as agreeing with the former in its foliation, with the latter in being evergreen. Its arms grow in time so weighty as often to bend the very stem and main shaft: the leaves much resemble those of the Larch, but are somewhat longer and closer set, erect, and perpetually green, which in that are not; but hanging down, dropping off, and deserting the tree in winter: the cones are tacked and ranged between the branch-leaves, in such order as nothing appears more curious and artificial, and at a little distance exceedingly beautiful: they have the bases rounder, shorter, or rather thicker, and with blunter points; the whole circumzoned, as it were, with pretty broad thick scales, which adhere together in exact series to the very summit, where they are somewhat smaller, but the entire lorication smoother couched than those of the Firs; within these repositories, under the scales, nestle the small nutting seeds, of a pear-shape: the cones grow upon the upper part of the branches, and stand erect, having a strong, woody, central style, by which they are firmly attached to the branch, so as with difficulty to be taken off; and which remains upon the branch after the cone is fallen to pieces, which never drops off whole, as in the Pine sort. It is a native of Mount Lebanon, &c., and is very lasting, being indestructible by insects.

The Cedar is now so far naturalized to our country as to produce ripe seeds; we may therefore have supplies without depending on the cones from the Levant: but it is found that they are more apt to produce and ripen their cones in hard winters than in mild ones; which is a plain indication that they will succeed even in the coldest seasons of the northern parts of the Island, where, as well as in the other parts, they might be propagated to great advantage.

The thirteenth sort is not much cultivated; but a particular sort of it has been brought from North America, which differs from the European sort in having darker shoots, but which has not long been known in Europe, though it grows plentifully in some of the northern parts of America. As it does not promise to make so large trees as the European sort, it should be planted with those of lower growth, to make a variety. It endures the severest cold of this climate.

The fourteenth is of quick growth, rising to the height of fifty feet: the branches ars slender, and their ends generally hang down: the leaves are long and narrow, in clusters from one point, spreading open above like the hairs of a painter's brush, of a light green, and falling off in autumn; in which circumstance this and the preceding differ from all the other species. In the month of April the male flowers appear, disposed in form of small cones: the female flowers are collected into egg-shaped obtuse cones, which in some have bright purple tops, but in others they are white; this difference is accidental, for seeds taken from either will produce plants of both sorts: the cones are about an inch long, and the scales are smooth; under each scale two winged seeds are generally lodged. It is a native of the South of Europe, and highly useful for planting in bleak situations, for the purpose of timber, &c.

There are different varieties:—the American, the Siberian, and the Chinese, require a colder climate than England, for the trees are apt to die in summer here, especially if they are planted on a dry soil: the cones of these which have been brought to England seem to be in general larger than those of the common sort; but there is so little difference between the trees in their characteristic notes, that they cannot be distinguished as different species, though in the growth of the trees there is a remarkable difference.

In the last, the cones are much larger than those of the common sort, and end in acute points: the scales prominent like those of the first species, and have little resemblance to those of the Larch. They are of a shrubby, spreading, but so hardy, as to thrive in the open air without any protection.

In the first, of which the branches are more slender, with a bark more inclining to yellow, and the scars more slender and clustered, the leaves are more tender, narrow, more glaucous, and the outer ones in each bundle shorter: cones only one-third of the size, blunt, with scales scarcely exceeding twelve in number, thinner, more shining, retuse-emarginate; the wings of the seeds are straight, more oblong, narrower, and, together with the seed itself, of a more diluted gray colour.

In the second, the bark of the branches is of an ash-coloured gray: the leaves a little wider, bright green, all nearly equal, commonly more

than forty in a bundle: the cones an inch long, with above thirty woody, striated, rounded, entire scales: the seeds brownish-gray, with subtriangular wings somewhat bent in. In both, the cones are bent upwards on very short peduncles.

It is observed by the editor of Miller's Dictionary, that "no tree is more valuable, or better deserves our attention in planting than the Larch." It is a native of the South of Europe and Siberia.

The timber is not only used in houses, but in naval architecture also. "It seems to excel," he says, "for beams, doors, windows, and masts of ships: it resists the worm: being driven into the ground it is almost petrified, and will support an incredible weight: it bears polishing excellently well, and the turners abroad much desire it. It makes everlasting spouts, pent-houses and featheredge, which needs neither pitch or painting to preserve them; excellent pales, posts, rails, props for vines, &c.; to these we may add the pallettes on which painters separate and blend their colours.

The fifteenth species is a noble upright tree: the branches not very numerous, but the bark smooth and delicate: the upper surface of the leaves of a fine strong green, and their under has two white lines running lengthwise on each side of the midrib, giving the leaves a silvery look, from which it takes its name: the cones are large and grow erect, and when warm weather comes on soon shed their seeds: the scales wide, deltoid, rounded above, below beaked, and appendicled with a membranaceous spatulate dorsal ligule, terminated by a recurved dagger-point: the nuts rather large, membranaceous, variously angular, dun-coloured. It is a native of Switzerland, &c.

It has been observed in Ireland, that no tree grows so speedily to so large a size as the Silver Fir.—Some at forty years growth, in a wet clay on a rock, measuring twelve feet in circumference at the ground, and seven feet and a half at five feet high; one tree containing seventy-six feet of solid timber. The earl of Fife also remarks, that no trees make a greater progress than this and the Larch. It is found to be excellent for boat-building.

The sixteenth is a beautiful tree, which rises with an upright stem: the leaves are dark-green on their upper surface, and marked with whitish lines underneath: the cones are roundish and small: the buds and leaves are remarkably fragrant. From wounds made in this tree a very fine turpentine is obtained, which is sometimes sold for the true Balm of Gilead. It grows to a large size in America, but has not done so in this climate.

It has very much the habit of the Silver Fir, but the leaves are wider and blunter, disposed on each side along the branches like the teeth of a comb, but in a double row, the upper one shorter than the under: underneath marked with a double glaucous line, and each has eight rows of white dots, and are often cloven at top. It is a native of Virginia.

The seventeenth species is a beautiful but delicate tree, and must have a good soil, with a warm situation; and it will be improved by tying its leading shoot to a stake annually as it advances.

It has the cone of the size and shape of a small hen's egg, and the whole of an ash-coloured bay: the scales coriaceous, thick, triangular, the outer side rounded and somewhat crenulate: the nuts a little smaller than in the Black Spruce, with a winged membrane on the outer side only. It is a native of many parts of North America, and does not thrive well in this climate.

The eighteenth, or Black Spruce, has shorter leaves, whiter on their under side than the White: the cones also are smaller and more compact. There is also a Red Spruce; but there seems to be no difference between this and the Black, either in the cones which have been brought from Newfoundland, or the young plants which have been raised in gardens in this climate.

The appellations of White and Black are given from the colour of the bark, as their is little difference in the colour of the wood, and the leaves of the Black are whiter on their under side than those of the White. They are both natives of North America;—the White upon the mountains; the Black upon the low grounds, generally in bogs or swamps. The first is by much the largest tree. This sort is easily known by its narrow leaves, placed on every side of the branches, and its long pendulous cones, which do not fall to pieces on the tree, but drop off entire the following summer: the scales open and emit the seeds on the first warmth of the spring.

There is a variety of this tree cultivated under the title of the Long-coned Cornish Fir, in which the leaves are longer, broader, of a lighter colour, and fuller on the branches: the cones also longer.

The nineteenth species is the loftiest of European trees, attaining a height from 125 to 150 feet, with a very straight trunk, and throwing out its spreading branches so as to form an

elegant pyramid: the leaves are clustered, without order, from an oblong cortical scale, four-cornered, drawn out into a sharp point, thickish, commonly curved a little; compressed, slightly keeled on both sides, shining on the upper surface: the male cones or catkins are ovate, scattered in the axils of the leaves, purple: the young female cones are also purple; and when ripe pendulous: they have eight rows of scales in a spiral, each row having from twenty to twenty-three scales, in each of which are two seeds. It is a native of Norway.

There are two principal varieties: the White and the Red, both of which afford the white deals. And *Burgundy Pitch* is prepared from the resin procured from this tree by boiling and straining it through a cloth.

There is no tree that yields greater profit than the Spruce Fir in cold land; no tree is more beautiful standing single on turf in large plantations, or more useful for shelter in cold soils and situations.

The twentieth is distinguished from the Black Spruce by the marks which have been given under the eighteenth species.

The twenty-first species was found in the Levant, and may be cultivated for variety.

Culture.—In all the sorts and varieties the increase is effected by means of seeds, which may be obtained from the well ripened cones by exposing them to the heat of a gentle fire or that of the sun, in which way the cells open and the seeds may be readily taken out. When the cones are not made use of in this way, they will remain several years without the seeds being injured, especially where they are close.

They should be sown in the early spring months, as March or the following month, on beds of fine earth, in a north-east aspect, or in large pots or boxes for the purpose of being occasionally removed into different situations as may be found necessary. They should be covered with nets to prevent the birds from pecking off the tops of the young plants, while the husks of the seeds are upon them; and be likewise screened from the heat of the sun at first.

All the sorts, except the Stone Pine and a few others, the scales of the cones of which are very hard, soon come up; but these frequently remain more than a year: the ground should therefore not be disturbed, being only kept clean from weeds in such cases.

Soaking the seeds in these cases may be useful, as well as sowing them in shaded situations.

The young plants in all the sorts should be kept quite clean and occasionally refreshed with water when the season is dry, in a very gentle manner, so as not to disturb the plants.

When they come up too close the plants should be thinned out in the summer, the thinnings being planted out immediately in a separate bed, in a shady place, being gently watered as there may be occasion. They should be set out in rows at the distance of four or five, and three or four in the rows. The tender kinds should be sheltered during the winter by frames or mats from the frosts, but with the others it is unnecessary.

When the plants have remained in these beds a year or more according to circumstances, they should be removed into other rows in the nursery at the distance of two feet, and one or more in the rows. In this situation they should remain till the periods of their being finally planted out.

The best season for the removal of the plants in all cases is towards the latter end of March or the beginning of the following month.

Where it can be done, it is the best way not to let them remain too long in these nursery situations, as the plants are always found to succeed best when planted out before they have acquired too large a growth.

When large plantations are to be made it is advised by some to raise the plants on a portion of the same ground, or as nearly similar to it as possible.

It is advantageous when they are to remain to have a large size to transplant them every two years, as by that means they form better roots and such as spread out more laterally, and of course the plants may be afterwards removed with greater safety.

In removing the plants, at all times great care should be taken to preserve the roots as much as possible, as well as all the branches, without cutting them.

When they have been finally removed, they require little more trouble, it being only necessary to keep them perfectly free from weeds, and supporting the larger sorts of plants with proper stakes: all the sorts should be suffered to take their own natural growth; being careful to preserve their tops perfectly entire, to shoot up as fast as possible and to branch out in their own way as no pruning is wanted, unless in the lowermost branches in particular trees which are thought too low and straggling, when these may be occasionally trimmed, cutting them close to the stem; but pruning should be very sparingly practised to these resinous trees, as lopping the branches contributes to retard their growth as well as impair their beauty. In large forest

plantations, where the trees are arrived to a large growth, it is however customary to lop their lower branches gradually for faggots, according as they begin to decay; for where these trees stand close, the upper branches generally kill those below, so that the lower tiers decay gradually and successively; in which case these decaying lower branches may be lopped by degrees in winter.

After the plantations designed for timber-trees have had eight, ten, or twelve years' growth, it may be proper to begin to thin them; those thinned out may serve for many smaller purposes, being careful in thinning to leave a sufficiency of the finest plants standing at proper distances to grow up for timber.

These trees are all highly ornamental evergreens for the pleasure-grounds.

In regard to the distribution or arrangement of the trees in the plantations, and mode of planting, those designed for the shrubbery and for ornamental plantations may be disposed both in assemblage with other trees, and to form clumps, and continued plantations. Those intended as forest-trees should generally be disposed alone in considerable plantations. The method of planting them is the same as in other hardy trees; but where large plantations in out-grounds are intended either for pleasure or profit, there will not be any great necessity for a previous preparation of the soil, with respect to digging or ploughing, only just to dig a hole for each tree: the same rule may also be observed in planting clumps of them in lawns, parks, and other grass-grounds, the mould being made fine in the bottoms of them. Those designed principally for ornament should be disposed at such distances as that their branches may extend freely every way; as the beautiful display of the head is a great merit in these trees in such plantations: but those intended for timber plantations may be put only four or five feet distant, in order that they may draw one another up straight and tall more expeditiously, and to admit of a gradual thinning after a few years' growth, for poles, &c.

The proper methods of raising and planting out all the different sorts, in the view of affording timber or shelter in large plantations, may be seen in the new edition of Miller's Dictionary.

PIPER, a genus containing plants of the herbaceous shrubby perennial exotic kinds.

It belongs to the class and order *Diandria Trigynia*, and ranks in the natural order of *Piperitæ*.

The characters are: that the calyx has no perfect spathe: spadix filiform, quite simple, covered with florets: perianthium none: there is no corolla: the stamina have no filaments: anthers two, opposite, at the root of the germ, roundish: the pistillum has a larger ovate germ: style none: stigma threefold, hispid: the pericarpium is a roundish one-celled berry: the seed single, globular.

The species are: 1. *P. nigrum*, Black Pepper: 2. *P. Amalago*, Rough-leaved Pepper; 3. *P. longum*, Long Pepper; 4. *P. methysticum*, Intoxicating Pepper, or Ava; 5. *P. reticulatum*, Netted-leaved Pepper; 6. *P. aduncum*, Hooked-spiked Pepper; 7. *P. pellucidum*, Pellucid-leaved Pepper; 8. *P. obtusifolium*, Blunt-leaved Pepper.

The first has a shrubby, very long, round, smooth, jointed stem, swelling towards each joint, slender, branched, scandent or trailing, rooted at the joints: the leaves acuminate, quite entire, equal at the base, flattish, bent back a little at the top and edges, alternate, of a dark green colour, at the joints of the branches upon strong sheath-like footstalks: the flowers sessile, lateral, and terminating, in simple, longish spikes, opposite to the leaves: the berry globular, of a red brown colour. It grows in the East Indies and Cochinchina.

Martyn observes, that "White Pepper was formerly thought to be a different species from the Black; but it is nothing more than the ripe berries deprived of their skin, by steeping them about a fortnight in water; after which they are dried in the sun. The berries, falling to the ground when over-ripe, lose their outer coat, and are sold as an inferior sort of White Pepper."

The second species is a shrub from three to ten feet in height: stem even: branches dichotomous, jointed, subdivided, round, brownish green: the leaves alternate, acuminate, not oblique, nerved and veined, very thin, bright green, smooth, paler underneath: the petioles round, smooth: the joints swelling: the spikes peduncled, opposite to the leaves, filiform, loose, many-flowered: the flowers clustered: the berry sessile, containing a single seed, double the size of hempseed, black when ripe, of a taste slightly pungent. It is a native of Jamaica and Hispaniola.

The third has the stems shrubby, round, smooth, branched, slender, climbing, but not to any considerable height: the leaves differing much in size and form; but commonly heart-shaped, pointed, entire, smooth, nerved, deep green, alternate: the flowers small, in short dense terminating spikes, which are nearly cy-

lindrical: the berries are very small, and lodged in a pulpy matter: like those of Black Pepper they are first green, and become red when ripe; they are hottest to the taste in the immature state, and are therefore gathered whilst green, and dried in the sun, when they change to a blackish or dark gray colour. It is a native of the East Indies.

The fourth species has a dichotomous stem, spotted, attaining the height of a fathom: the leaves oblong-cordate, not roundish-cordate: the spikes straight, short, solitary, and not aggregate, long, and nodding. It is a native of the islands of the South Seas.

It has the property of intoxicating when chewed.

The fifth is a shrub: the stem about five feet high, sending out several side branches which have protuberant joints: the leaves six inches long and five broad near their base; they have five veins springing from the footstalk, the middle one going in a direct line to the point; the two side veins diverge towards the edges of the leaves in the middle, but approach again at the top; the surface of the leaves is full of small veins, which form a sort of net-work: the spikes come out from the side of the branches opposite to the leaves; they are slender, and about five inches long, a little bending in the middle, and are closely set with very small herbaceous flowers. It is a native of Jamaica.

The sixth species has the stems several, shrubby, round, knobbed at the joints, smooth, an inch and more in thickness, branched, ash-coloured, upright, eight feet high: the branchlets green, the thickness of a quill, spreading very much: the leaves alternate, on short petioles, in a double row, a little shorter at the inner base, deep green above, rugged backwards, rough-haired when examined by a glass; underneath pale green, villose but not rugged; quite entire, netted with numerous veins, many-nerved if the principal veins be considered as nerves; they are about half a foot in length, and have little taste or smell: the stipule lanceolate, acute, converging, smooth, striated, caducous: the peduncles alternate, opposite to a leaf, solitary, erect, round, somewhat villose, half an inch long: the spikes solitary, slender, yellowish, two or three inches in length, towards the origin of the branchlet bowed, so closely covered with minute fructifications, that it is scarcely possible to detect their structure even with a microscope. It is called Spanish Elder in Jamaica, where it is a native.

The seventh is annual: the stalks are succulent, seven or eight inches high: the leaves an inch and half long, and three quarters of an inch broad: the spikes of flowers come out at the end of the stalks, are slender, about an inch long, and straight: the flowers are very small, and sessile, appear in July, and are succeeded by very small berries, each containing a small seed like dust. It is a native of South America.

The eighth species sends out from the root many succulent herbaceous stalks almost as large as a man's little finger; they are jointed, and divide into many branches, never rising above a foot high, but generally spread near the ground, putting out roots at each joint, propagate very fast, and soon cover a large space of ground: the leaves are very thick and succulent; they are about three inches long and two broad, very smooth and entire: the peduncle comes out at the end of the branches; this is also very succulent, and the whole length, including the spike, is about seven inches: the spike is straight, erect, and about the size of a goose-quill, closely covered with small flowers which require a glass to be distinguished; the whole spike much resembles the tail of a lizard. It is a native of South America, flowering from April to September,

Culture.—All these plants may be increased by seeds, procured fresh from the countries where the plants grow naturally, which should be sown upon a good hot-bed in the spring, and when the plants come up and are fit to transplant, be each put into a separate small pot filled with light fresh earth, and replunged into a hot-bed of tanner's bark, shading them every day from the sun till they have taken fresh root, when they must be treated in the same way as other tender exotic plants, admitting fresh air to them daily in proportion to the warmth of the season, to prevent their drawing up weak; and when the nights are cold the glasses of the hot-bed should be covered with mats.

They all require the constant protection of a hot-house.

As the stalks of most of them are tender when young, they should not have much wet, which rots them; and when water is given it must be with caution, not to beat down the plants; for when that is the case they seldom rise again, afterwards.

In some of the sorts they may be raised from layers or cuttings.

In the after-management of the plants, they must be plunged into the tan-bed of the bark-stove in the autumn, and during the winter be sparingly watered: they require the same warmth as the Coffee-tree. In the summer a large

share of fresh air must be admitted in hot weather, and they must be constantly kept in the stove, as suggested above.

They afford ornament and variety in stove-collections.

PIPER. See CAPSICUM.

PIPER JAMAICA. See MYRTUS PIMENTA.

PIPERIDGE TREE. See BERBERIS.

PISCIDIA, a genus furnishing pants of the exotic tree kind.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leafed, bell-shaped, five-toothed perianthium: the upper teeth nearer: the corolla papilionaceous: banner ascending, emarginate: wings the length of the banner: keel crescent-shaped, ascending: the stamina have ten filaments, uniting in a sheath cloven above: anthers oblong, incumbent: the pistillum is a pedicelled germ, compressed, linear: style filiform, ascending: stigma acute: the pericarpium is a pedicelled legume, linear, with four longitudinal membranaceous angles, one-celled, separated by doubled isthmuses: the seeds some, subcylindric.

The species are: 1. *P. Erythrina*, Jamaica Dogwood Tree; 2. *P. Carthaginiensis*, Carthaginian Piscidia.

The first in its native situation rises with a stem to the height of twenty-five feet or more, almost as large as a man's body, covered with a light-coloured smooth bark, and sending out several branches at the top without order: the leaves are pinnate, with seven leaflets for the most part, two inches long, and one inch and a half broad, commonly opposite: the flowers of a dirty white colour, succeeded by oblong pods, which have four longitudinal wings, and are jointed between the cells. It is a native of Jamaica.

The second species differs from the first in the shape and consistence of the leaves, which are more oblong and of a firmer texture; in other respects they are very similar. It is a native of the West Indies.

Culture.—They are capable of being increased by seeds, when they can be obtained fresh from the countries where they grow naturally. They should be sown upon a good hot-bed in the spring, and when the plants come up and are fit to transplant, be each planted in a small pot filled with light earth, and plunged into a hot-bed of tanner's bark, and afterwards treated in the same way as the other tender exotics of the same kind.

They afford variety in the stove.

PISONIA, a genus containing plants of the exotic tree kind for the stove.

It belongs to the class and order *Polygamia Dioecia*, (*Heptandria Monogynia*,) and ranks in the natural order of *Nictagineæ*.

The characters are: that in the male—the calyx is scarcely any: the corolla one-petalled, bell-shaped, five-cleft: segments acute, patulous: the stamina have five, six, or seven awl-shaped filaments: anthers roundish, twin: the pistillum is an oblong germ: style short: stigma pencil-shaped: female—the calyx and corolla as in the male: the pistillum is an oblong germ: style simple, cylindrical, longer than the corolla, erect: stigmas bifid: the pericarpium is an oval berry, often five-cornered, valveless, one-celled: the seed single, smooth, oblong.

The species is *P. aculeata*, Prickly Pisonia.

The male and female plants differ considerably.

The first has stalks as thick as a man's arm, which rise ten or twelve feet high: the bark is of a dark brown colour, and smooth; these send out many branches by pairs opposite, which are much stronger than those of the female, and do not hang about so loose: they are garnished with obovate stiff leaves, an inch and a half long, and an inch and a quarter broad, standing opposite, on short footstalks. From the side of the branches come out short spurs, like those of the Pear-tree, having each two pairs of small leaves at bottom, and from the top comes out the peduncle, which is slender, about half an inch long, dividing at the top into three; each of these sustains a small corymb of herbaceous yellow flowers, each having five stamina standing out beyond the petal, terminated by obtuse anthers.

In the female the stalks are not so strong as those of the male, of course require support. These rise eighteen or twenty feet high, sending out slender weak branches opposite, which are armed with short, strong, hooked spines, and have small oval leaves, about an inch and three quarters broad; these stand opposite on the larger branches, but on the smaller they are alternate, and have short footstalks: the flowers are produced in small bunches at the ends of the branches, sitting upon the germ; they are shaped like those of the male, but have no stamina; in the centre is situated a cylindrical style, crowned with five spreading stigmas: the germs afterwards turn to a channelled, five-cornered, glutinous capsule, armed with small crooked spines, each containing one oblong, oval, smooth seed. It is a native of Jamaica, where it is called *Cock's-spur*, or *Fingrigo*; and flowers in March and April.

Culture.—It is increased by seeds, which should be sown in pots filled with light rich earth, and plunged into a hot-bed of tanner's bark; and when the plants come up, they should be transplanted into separate pots, and plunged into the hot-bed again, where they may remain till autumn, when they should be removed into the stove, and plunged into the bark-bed, and treated in the same manner as has been directed for several tender plants of the same country; in hot weather giving them plenty of water, but in winter more sparingly.

They are too tender to thrive in the open air of this country at any season of the year, they should therefore be constantly kept in the stove. They retain their leaves most part of the year in this climate.

They afford variety in stove collections of exotic plants.

PISTACHIA NUT. See Pistacia.

PISTACIA, a genus containing plants of the exotic deciduous tree and shrubby evergreen kinds.

It belongs to the class and order *Dioecia Pentandria*, and ranks in the natural order of *Amentaceæ*.

The characters are: that in the male—the calyx is a loose ament, scattered, compressed, of small one-flowered scalelets: perianthium proper, five-cleft, very small: there is no corolla: the stamina have five filaments, very small: anthers ovate, four-cornered, erect, patulous, large: female—the calyx ament none: perianthium trifid, very small: there is no corolla: the pistillum is an ovate germ, larger than the calyx; styles three, reflex: stigmas thickish, hispid: the pericarpium is a drupe dry, ovate: the seed is a nut ovate, smooth.

The species are: 1. *P. vera*, True Pistacia Tree; 2. *P. Terebinthus*, Common Turpentine Tree; 3. *P. Lentiscus*, Mastick Tree.

The first grows to the height of twenty-five or thirty feet; in its native situation the bark of the stem and old branches is of a dark russet colour, but that of the young branches is of a light brown: the leaves are composed of two or three pairs of leaflets terminated by an odd one; they approach towards an ovate shape, and their edges turn back. They emit an odour like that of the nut, when they are bruised. Some of the trees produce male flowers, others female; and some, when they are old, have both on the same tree. The male flowers come out from the side of the branches in loose bunches, and are of an herbaceous colour: the female flowers come out in the same manner in clusters. It is a native of Persia.

In the second species the situation of the buds is similar to that in the preceding species: the leaflets seven, the middle ones for the most part larger, or the odd leaflet and the two inmost smaller than the four others; each ovate-oblong, by no means acuminate but styled, most of them also are wider on one side. It is by some described as a low shrub, but very thick: the wood is odorous and balsamic: the leaves have two pairs of leaflets, terminated by an odd one which is larger: they are firm, and shining on the upper surface: the flowers from branching catkins at the axils of the leaves, and are reddish. It is a native of Barbary and the South of Europe, flowering here in June and July.

The Cyprus or Chian Turpentine, which this tree furnishes, is procured by wounding the bark of the trunk in several places, during the month of July, leaving a space of about three inches between the wounds; from these the Turpentine is received on stones, upon which it becomes so much condensed by the coldness of the night, as to admit of being scraped off with a knife, which is always done before sun-rise: in order to free it from all extraneous admixture, it is again liquefied by the sun's heat, and passed through a strainer; it is then fit for use.

The third rises to the height of eighteen or twenty feet, the trunk being covered with a gray bark. It sends out many branches, which have a reddish brown bark: the leaves have three or four pairs of small leaflets, of a lucid green on their upper, but pale on their under side: the midrib has two narrow borders or wings running from one leaflet to another: the male flowers come out in loose clusters from the sides of the branches, are of an herbaceous colour, appear in May, and soon fall off; they are generally on different plants from the fruits, which also grow in clusters, and are small berries, of a black colour when ripe. It is a native of the South of Europe and the Levant.

There is a variety which rises to the same height as the preceding; but differs from it in having a pair or two of leaflets more to each leaf, much narrower and of a paler colour. It is a native of the country about Marseilles, &c.

Culture.—The first is capable of being increased by the seeds or nuts, procured from abroad and planted in the spring, in pots filled with light kitchen-garden earth, plunging them into a moderate hot-bed: when the plants appear, a large share of air should be admitted to them, to prevent their drawing up weak; and by degrees they should be hardened to bear the open air, to which they may be exposed from the beginning of June till autumn, when they should be placed under a hot-bed frame to screen them from the frost in winter; as while young, they are too tender to live through the winter in this climate

without protection, but should always be exposed to the air in mild weather: they shed their leaves in autumn, and therefore should not have much wet in winter. In the spring, before the plants begin to shoot, they must be removed each into a separate small pot; and be plunged into a very moderate hot-bed, to forward their putting out new roots. As soon as they begin to shoot, they must be gradually hardened, and placed abroad again.

These plants may be kept in pots three or four years till they have got strength, during which time they should be sheltered in winter; and afterwards be turned out of the pots, and planted in the full ground, some against high walls to a warm aspect, and others in a sheltered situation, where they bear the cold of our ordinary winters very well, but in severe frosts are often liable to be destroyed. The trees flower and produce fruit, but the summers are seldom warm enough to ripen the nuts.

The third sort is also capable of being increased by laying down the young branches, which, if properly managed, put out roots in one year, and may be cut off from the old plants, and be planted out into separate small pots. These must be sheltered in winter, and in summer placed abroad in a sheltered situation, and treated in the same way as other hardy kinds of green-house plants.

When raised from seeds they should be taken from trees growing in the neighbourhood of the male plants, as otherwise they will not grow. When these plants have obtained strength, some of them may be turned out of the pots, and planted against warm walls; where, if their branches are trained against them, they endure ordinary winters very well, and with a little shelter in severe winters may be preserved with safety.

They are curious and ornamental in different situations.

PISUM, a genus comprising plants of the hardy herbaceous kind.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leafed, five-cleft, acute, permanent perianthium: the two upper segments shorter: the corolla is papilionaceous: standard very broad, obcordate, reflex, emarginate with a point: wings two, roundish, converging, shorter than the standard: keel compressed, semilunar, shorter than the wings: stamina have diadelphous filaments; one simple, superior, flat, awl-shaped; and nine awl-shaped below the middle united into a cylinder which is cloven at top: anthers roundish: the pistillum is an oblong, compressed germ: style ascending, triangular, membranaceous, keeled with the sides bent outwards: stigma growing to the upper angle, oblong, villose: the pericarpium is a large legume, long, roundish or compressed downwards, with the top acuminate upwards, one-celled, two-valved: the seeds several, globular.

The species are: 1. *P. sativum*, Common Pea; 2. *P. maritimum*, Sea Pea; 3. *P. Ochrus*, Yellow-flowered Pea.

The first has an annual, slender, fibrous root: the stems hollow whilst young, brittle, branched, smooth, weak, climbing by terminating tendrils: leaves abruptly pinnate, composed usually of two pairs of leaflets, which are oval and smooth: the stipules large, surrounding the stem or branch: the flowers lateral, two or three together on long peduncles: the corolla white, greenish white, purple or variegated: the legumes commonly in pairs, about two inches long, of an oblong form, smooth, swelling at the straight suture, where the seeds are fastened, flatted next the other suture, which arches, especially towards the end: the seeds from five or six to eight or nine, commonly globular, but in some varieties irregular or approaching to a cubic form, smooth, white, yellow, blue, gray, brown, or greenish, with a small oblong umbilicus: the colour of the whole plant is glaucous, or hoary green, from a white meal which covers it. It is said to be a native of the South of Europe.

There are two principal varieties, the white and gray; and several sub-varieties, the principal of which are:

Early kinds.—The Early Golden Hotspur; Early Charlton Hotspur; Nichols's Early Golden Hotspur; the Early Charlton; the Reading Hotspur; Masters's Hotspur; Ormrod's Hotspur; Early Dwarf Hotspur; Leadman's Dwarf; Fan Spanish Dwarf; Early Dwarf Frame Pea; Pearl Pea; Cluster Pea; Royal Green Pea; Essex Hotspur; the Dwarf Pea; the Sugar Pea.

Late kinds.—Spanish Morotto; Nonpareil; Sugar Dwarf; Sickle Pea; Marrowfat; Dwarf Marrowfat; Rose or Crown Pea; Rouncival Pea; Gray Pea; Large Gray Pea; Crooked Gray Pea; Long-bearing Pea; Green Field Pea; White Field Pea; Pig Pea.

Many of the first sub-varieties are very early, and, being low growers, require sticks of three or four feet only in height, and often not so much. New varieties of these are raised almost every year, which, because they differ in some

slight particular, are sold at an advanced price, and have frequently the names of the persons who raised them, or the place where they first grew. These varieties are not permanent, and without the greatest care will soon degenerate.

The second species has a perennial root, running far and deep among the stones or into the sand in every direction: the stems are procumbent, quadrangular, a little compressed, striated, smooth, leafy, many-flowered, glaucous, often reddish: the leaves alternate, alternately and abruptly pinnate, spreading: the leaflets sessile, oval, obtuse with a little point, entire, smooth, many-veined, glaucous; common footstalk flattish, striated, ending in a branched thread-shaped smooth tendril: the stipules two together, equal, acute, toothed at the base, of the texture and colour of the leaflets, but smaller: the clusters of flowers axillary, solitary, as long as the leaves, erect, many-flowered: the common peduncle round, striated, smooth: pedicels alternate, short, single-flowered: the flowers rather large, a little drooping: the corolla beautifully variegated with red and purple.

According to Mr. Woodward, the stems are slightly pubescent and short: leaves numerous: leaf-stalks angular, pubescent: leaflets alternate, on the lower leaves five or seven, upwards nine or eleven; there being always one more on the lower than on the upper side of the leaf-stalk, which is terminated by a tendril, sometimes simple, but oftener bifid at the extremity: stipules oval-lanceolate, broad, arrow-shaped at the base: flowers crowded on the summit of the naked peduncle: pods long and narrow.

It is remarked by Dr. Smith, that this species is almost as nearly allied to Lathyrus as to Pisum, both in habit and generic character; and that Pisum sativum is not more different in external appearance from the genus of Lathyrus, than Vicia Faba or the Bean is from the other Viciæ. These, however, he adds, are matters of opinion: and in so natural a class, it is very difficult to find out certain and obvious marks of distinction. It is a native of the sea-shores of Europe, &c.

The third has an annual root: the stalk is angular, near three feet high: the leaves on winged footstalks, each sustaining two oblong leaflets: the flowers are pale yellow, and small: the pods two inches long; containing five or six roundish seeds, a little compressed on their sides; these may be eaten green, but unless they are gathered very young, they are coarse, and at best not so good as the common Pea. It is a native of the South of Europe, and of the Levant. It flowers in June and July.

Culture in the open Ground.—All the sorts of the first kind are raised from seed, sown annually; and as those of one sowing continue but a short time in bearing, several sowings are requisite each season, to continue successions for the table all summer; each sowing to remain where sown, choosing a warm dry border, &c. for the earliest crops; and for the succeeding ones, any of the common quarters, in a free exposure, distant from the shade of trees, &c., but open to the sun.

For the late crops the more moist parts are the best.

The general sesaon for sowing is any time in open weather, from the latter end of October, or in November, until May or June.

But in order to have green Peas as early as possible, recourse must be had to the assistance of hot-beds, by the aid of which they are obtained in March and April, and continued till the coming in of the natural ground crops, in the latter end of May or beginning of the following month.

The early and first general Crops.—Towards the latter end of October, in November or December, as the weather may be convenient, the earliest crops should be put into the ground. In warm soils and situations it is always advisable to sow a few in the two former months; but in general, and especially in open exposed grounds, November and December is time enough to begin the principal sowings. For this purpose the Earliest Charlton or Golden Hotspurs are the most proper.

And in order for their reception a warm south border, or some other dry, sheltered, sunny situation should be dug over and prepared; when, in a dry day, drills should be drawn by a line, ranging south and north, to enjoy the greater advantage of the sun's influence, making them an inch and a half deep, and two feet and a half at least asunder; but if designed for sticks, three feet and a half will be a more proper distance. Then the seed should be scattered in evenly along the middle of each drill, rather thickish, as they are liable to accidents from vermin and the season, covering them in regularly with the earth either with a rake or hoe, being careful that they are all equally covered the depth of the drills; and then with rake lightly trim the surface smooth; which finishes the work.

The peas begin to germinate in a fortnight, if mild weather, and come up in three weeks or a month, but seldom in less time at this season; when the plants are to be managed as directed below.

Another sowing should be performed in three weeks or a month after this; or when the first was sowed in October or early in the following month, it is better to repeat the sowing in a fortnight or three weeks, for fear the first should fail; and after this continue sowing once in three weeks or a month all winter in mild weather. But towards spring a principal crop of the Reading and other large Hotspurs should be sown; and as the season advances, the sowings be made in more open exposures, and more in quantity than the early ones: and as the spring draws on, the sowings should also be repeated oftener; as from the close of the year till the beginning of April, they should be once in three weeks; and from that time till May, once a fortnight, especially as the warm weather increases.

The winter and early spring sowings differ materially in the time they require to germinate: those sown any time in winter are sometimes three weeks or near a month before they appear, while those sown towards spring come up much sooner in the later spring sowings, often in a very short time.

In the later of the above sowings, some of the dwarf sorts may be introduced; as Leadman's Dwarf, both for middle and late crops.

As the plants of each sowing come up, and are advanced two or three inches in height, it is proper to begin the first culture by drawing a little earth with a hoe, or small rake, lightly up to their stems on each side of the different rows to strengthen and forward their growth; repeating the earthing once or twice at proper intervals, as occasion may require, and at the same time cutting up and clearing away all weeds; and when the crops are six or eight inches in height, those designed for support should be sticked.

As the earliest crops are often in danger from the severity of frosts, it is proper, when they are about an inch or an inch and a half high, to draw a little fine earth lightly up to their stems in a dry day; it will also be of much advantage to give occasional protection to such crops in severe weather, by covering them lightly with long, light, dry litter, of the strawy kind, or by mats; which, where there is but a moderate quantity in warm borders, may be more easily effected; but this need only be practised in very severe frosts. They must however be carefully uncovered every fine day in temperate weather; and the moment the frost disappears the covering be entirely removed; as they must by no means be kept too close, which would draw them up weak and tender.

When in blossom, if the weather should prove dry and warm, a few good waterings in the mornings will be beneficial; and when the blossoming plants are advanced a considerable height, if they are then topped, it will promote their podding and coming to perfection.

As to the succeeding crops of the different kinds, all they require is hoeing up the earth to their stems occasionally, and cutting up all weeds when they appear; those designed for support being always sticked as soon as they are half a foot high, or a little more, before they begin to fall down on their sides, providing sticks about four or five feet long, and placing one range to each row principally on the south or most sunny side of the rows, as the plants naturally incline towards tha sun, and of course more readily attach themselves to the sticks.

In the culture of the larger kinds, for successional general crops, such as the Marrowfats; Spanish Morattos; &c.; they may be begun sowing in January, the Dwarf Marrowfats first; but the three following months are the most proper for the general crops of all the large kinds; a free exposure in the most open quarters being made use of, drawing drills by line, about an inch and a half or two inches deep, and not less than a yard asunder, and when sticked, four feet, and for the largest sorts four feet and a half to five feet, in single or double rows.

In these cases the seed should be sown thinly along the middle of each drill, drawing the earth evenly over them with the rake, hoe, or feet, covering them equally the depth of the drills, and raking the surface smooth; these sowings being repeated once a fortnight or three weeks; and as the spring advances, once a fortnight, especially from the beginning of April until the end of the following month. Afterwards a few may be sown every ten or twelve days. Late sowings are, however, seldom very fruitful, being often attacked with the mildew; but it is proper to endeavour to have some as long in the season as possible.

When these different crops are come up about three inches high, they should have earth laid up to them on each side of the rows, cutting down all weeds, and repeating the hoeings occasionally according as the growth of weeds may require; and when they are half a foot, or eight or ten inches high, they should have the sticks placed to them; which for these large sorts require sticks six or seven feet high, at least, placing them on the sunny side of the rows, as directed above.

For late crops, any of the sorts, either Hot-

spurs or larger kinds, may be continued sowing all May and until the middle or latter end of June; likewise some of the dwarf sorts at a later period for late production. It may be proper to sow larger portions of Rouncivals for the latest crops, on account of their being rather the hardiest to struggle with the summer's heat and drought, and thereby most to be depended on for a late production.

For these crops some of the moistest ground should be chosen; and if the weather should prove very dry and hot, it will be of importance to soak the seed in soft water six or eight hours previous to sowing; or the drills may be well watered after it has been done; either of which will promote their rising expeditiously and more regularly.

It may be observed, in respect to the times of sowing, that it is a good rule, in the different sorts, as soon as one crop appears fairly above ground, to sow another to succeed it of the same kind, so as to have a regular succession of crops following one another in bearing; and if a crop of Marrowfats, &c., and another of Hotspurs, be sown on the same day, the Hotspurs will come into bearing a fortnight the soonest, and the Marrowfats will arrive to a bearing state about the time the others are going out, just in due time to succeed them; which should be attended to in order to have these sorts form a regular succession to each other.

In gathering the crops, both hands ought always to be employed; one to hold the peduncle or footstalk of the fruit, while the other pulls the pods; otherwise the stem or main stalk of the plant, being slender, fragile, and weak, is liable to be broken and destroyed; and the gatherings should always be regularly performed according as the pods fill, never letting them stand to grow old, as they are in the greatest perfection for eating while green, and the plants continue longer in bearing. Crops of peas continue only about a fortnight in full bearing, during which time they furnish a plentiful gathering of pods in their perfection; though in moist showery weather they sometimes continue shooting and flowering three or four weeks; but the produce after the first fortnight is generally inferior both in quantity and quality.

As soon as the crops are past bearing, all the sticks should be taken up and tied in bundles, being set upright in any dry corner for future use.

Culture in Hot-beds.—In order to have green Peas as early in the year as possible, recourse must be had to the assistance of hot-beds; and the proper sorts for this purpose are the early dwarf kinds, which by this means may be brought into bearing in March, or the following month.

In this intention it is rather the best mode to raise the plants first in the natural ground, by sowing in October or the following month, giving occasional protection from frost; and when one or two inches high, to transplant them into the hot-bed, in January or the beginning of the following month, as by this practice the luxuriant growth of the plants is so checked by the removal, that they shoot more moderately, and thereby blossom and bear sooner and more abundantly.

The sowings should be performed in a warm, dry, south border, or in some similar dry sheltered part of light good earth, in a bed of proper dimensions to have the protection of a frame, &c., in severe weather; sowing them in drills about a foot asunder, in the manner as for the common crops: when they are come up and advanced a little in growth, in a dry day some fine earth should be drawn up to their stems, giving suitable protection in bad weather.

But they may be sown on a moderate hot-bed in December or January, under frames, &c., and when the plants are up, plenty of free air should be admitted every temperate day, and be defended in the nights from frost, snow, and cutting cold; or some may be sown in large pots, and be placed in a hot-house, &c., to bring up the plants quickly for transplanting into the intended hot-bed in January. And they may be sown at once in a hot-bed at the above periods, to remain for bearing: but it is generally more eligible to have the plants previously raised an inch or two in height, either by early sowing in the full ground, or forwarded under frames, or in a hot-bed, &c., as above, for transplanting into a fresh-made hot-bed for bearing.

In either of the above methods of raising the plants for transplanting, when advanced from one to two inches in growth, or little more, they are proper for planting out into the hot-bed to remain for fruiting.

In mild weather, towards the middle or latter end of January, or the beginning of the following month, at furthest, a hot-bed for one or more of the largest three-light frames and glasses should be prepared, which may be either of dung or tan; the latter, where it can be obtained easily at a moderate expense, is considerably the best for this purpose. It should be made two feet and a half or a yard thick, and covered with frames and lights, and when in a moderate temperature the earth be put on for the reception of the plants. Any light good dry earth

may be employed, which should be laid eight or ten inches thick all over the bed; then in a dry mild day the plants may be taken up, raising them with their roots as entire as possible, with what earth will readily hang about the fibres; and after drawing small drills in the earth of the hot-bed, from the back to the front of the frame, a foot and a half asunder, and about an inch deep, the plants should be put in the drills, not more than an inch apart, covering in the earth close to their roots and stems, and giving a very light watering, just to settle the earth; after which the lights should be put on; being careful to raise them occasionally at the upper end to give vent to the steam, &c.: and at first planting out, when in sunny weather, if the plants should flag, a moderate shade should be given in the middle of the day, till the plants have taken root and established themselves.

After this, fresh air must be admitted to the plants daily in fine weather to strengthen them, by tilting the upper end of the lights according to the temperature of the bed and outward air; keeping them close in cold nights, and covering also with mats: occasional moderate waterings should likewise be given in fine days, and, as the plants advance in growth, a little earth be drawn up to their stems once or twice; repeating the moderate refreshments of water frequently as the warm season advances; which may be given more freely when the plants are in bloom. And according to the advanced growth of the plants and increased warmth of the weather, a larger share of fresh air in proportion should be given; and when they are in blossom, if the sun at any time appears too violent for them through the glasses, it is advisable to give a very slight shade an hour or two in the heat of sunny days; likewise, when in full blossom and fruiting, to admit plenty of free air, even sometimes in fine days shoving the glasses entirely off; also still continuing the waterings more abundantly during the time of setting and growth of the pods, and indulging them with the benefit of warm showers of rain. In this way the plants may be brought to bearing in March or April; and by a succession of two crops, in hot-beds made at three or four weeks' interval, and managed as above, a supply be continued till the natural ground crops come into bearing in May.

Where there is the convenience of fruit forcing-houses, hot-walls, &c. a few of the earliest kinds, either previously raised in young plants an inch or two in growth, as in the hot-bed culture, or in default of it, the seed sown; and which being in pots, are placed in these departments; or where there are internal borders of earth, some young plants may be placed therein. The internal moderate heat of the above departments, effected either by bark-beds, &c. or fire, or both occasionally, in a requisite degree for forcing the fruit-trees to early production, forwards the malso, so as to have some for gathering in the most early season, in a small proportion.

Culture in the Field.—Where designed to raise crops in order to gather the produce green and young for the supply of markets, November, or rather December, is soon enough to begin the first sowings, especially in open exposed grounds; a dry light soil being chosen for the more forward sowings. As to the sorts, any of the Hotspurs may be used for the forward crops, and for a general crop the Reading Hotspur is excellent; and after that sort, the Masters's and Ormrod's, &c. but of the large kinds the Marrowfats and Spanish Morattos should be chosen for the main crops.

The ground for their reception must be prepared by proper ploughing and harrowing; drills are then to be drawn with a hoe crossways the lands, or with a drill-plough lengthways, two feet at least, or two and a half asunder for the early and three for the larger sorts. As no sticks are intended for these large field crops, having sown the seed, it should be covered in either with the hoe, rake, or harrow; but the hoe or rake will cover them more evenly, and almost as expeditiously. When they come up they must be kept clean from weeds, by broad-hoeing; but this is sometimes performed in fields by horse-hoeing for the sake of expedition; which, having hoes fixed in a sort of plough horizontally, is drawn by a horse between the rows, a man holding the plough-shafts to guide it: but as this can only cut down the weeds, a common drawing hand-hoe must be used to earth up the plants: though this is often disregarded in the field-culture, it however proves very beneficial to the crops.

In these cases the rows should be laid down so as to face the sun as much as possible.

Saving Seed.—In order to save seed, some of each sort should be suffered to stand entirely for that purpose, or some sown of each purposely in different parts, and the whole produce suffered to remain and ripen for seed.

In the latter mode they should be sown in February in some open ground, in rows two or three feet asunder, no sticks being required, and, when the plants come up, be kept clean from weeds by hoeing, the earth being laid up to their stems once or twice. When they are in bloom, they should be examined row by row, to see if there be any degenerate sort, which, when present, must be pulled out; or if any improved

variety be discovered, to mark it; which is the only method to preserve both the purity of the known sorts, and to procure new varieties. For example, if amongst the Hotspurs any large sorts appear, they should be removed directly; also any Hotspurs, &c,. from amongst the large kinds, and different sorts of any of these from each other; and if any new sort discovers itself either by flowering earlier than all the rest, or possessing some other singularity, or noticeable merit for culture, it should be carefully marked, the seed being saved separate, to sow separately for furnishing a proper increase.

According as the seeds of the different sorts ripen in July and August, which is discoverable by the pods changing brown, and the seed becoming a little hard, the haum should be cut or pulled up in dry weather, and exposed in heaps in the sun, turning them every day; and when the seed is become perfectly dry and hard, it may either be threshed out directly, or stacked up in a dry situation till another opportunity: but when threshed, each sort must be kept separate, and when properly cleaned be put up in sacks with the name of each upon them.

PLANE TREE. See PLATANUS.

PLANTAIN TREE. See HELICONIA.

PLANTATION, a large collection of different sorts of trees, planted out either for ornament, or the advantage of the wood as timber, or for both purposes.

Plantations of these kinds not only afford great improvement to estates, but are highly ornamental to the country. They should therefore be more particularly attended to where there are large tracts of poor barren lands that cannot be converted to the more profitable purposes of tillage or grass.

They have also a fine effect in the vicinity of habitations and pleasure-grounds. And in many cases the proprietors of estates, whether of large or moderate sizes, may reap great pleasure and advantage in allotting a part of them to this use, as they give grandeur as well as an air of fertility; and, after the first eight or ten years, in many cases bring in great profit by the gradual thinning of the underwood, besides leaving a sufficiency of standards to attain full growth.

The expense attending the making of Plantations, and the knowing that they must wait several years before the trees have made any considerable progress, or can afford any advantage, often prove an obstacle in attempting the prosecution of the business; but the expense of planting where the plants are raised on the grounds, will not be so great as may be imagined, especially as a small spot of nursery-ground will raise plants enough in three or four years, to plant a great many acres of land, and the expense of raising and planting, with the loss of time in waiting until the plants attain some growth, will be compensated by the first fall or thinning, in eight or ten years after planting; and the stools which remain shoot up again, in many of the deciduous kinds, and afford a lopping every eight or ten years, exclusively of the due portion of standards left at proper distances, to attain full growth for timber.

In making Plantations, it is necessary to choose such trees as are the best adapted to the nature of the particular soil and situation.

As to the proper sorts of trees or shrubs, most of the deciduous and ever-green kinds may be employed with propriety, and young plants, of from about two or three to five or ten feet in height, always prove more successful than such as are older; for although some, from their being in haste to have Plantations as forward as possible, transplant tall trees, perhaps twelve or fifteen feet high or more, especially for those of the ornamental kind; those of younger growth always take root sooner, and establish themselves more firmly, so as to form considerably the finest Plantations at last, and are of longest duration: for though large trees of from fifteen to twenty feet in height, especially of the deciduous kind, may with care be transplanted, so as to grow, and probably thrive tolerably for some years, yet by not rooting firmly like young plants, they often fail, and after some years' standing have hardly made any shoots, and at last gradually dwindle and perish. Large trees should of course never be employed except on particular occasions, where a few may be necessary to form an immediate shade or blind, &c. in some particular place: but for general work, young plants, either raised, or purchased from the nurseries, should be made use of. And for principal Timber Plantations in particular, such plants as are only from about two or three, to five or six feet in height, or eight or ten at most, must be employed, having those of the same Plantation, as nearly of equal growth as possible. See PLANTING.

Where Plantations are intended principally for ornament, as great a variety as possible of the different sorts of hardy trees and shrubs should be employed, and should consist of lofty and middling growing trees, as well as of shrubs. See DECIDUOUS and EVER-GREEN TREES.

In regard to the disposition of the plants, the deciduous and ever-green kinds may be planted in separate compartments, or in mixture, and sometimes the tree-kinds by themselves, some in running varying Plantations,

towards the boundaries of lawns, parks, paddocks, &c. others in avenues, groves, thickets, and clumps, variously disposed in different parts; and sometimes the trees and shrubs together, forming shrubberies, wildernesses, shady walks, and wood-works; placing those of taller growth backward, and the lower in front; bordering the whole with the most beautiful flowering shrubs and showy ever-greens, especially next the principal walks and lawns, varying the form of all the several compartments, sometimes by moderate sweeps and curves outward and inward, of different dimensions, other parts in long easy bends, varied projections and breaks, so as to diversify the scene in imitation of natural Plantations. The proper distances, in planting, may be from five or ten to fifteen or twenty feet: for example, the tall trees designed for continued Plantations may be from ten to fifteen or twenty feet, varying the distance in different parts, according to light and shade, &c. and those in groves, where open may be fifteen or twenty feet distance, and where close ten or twelve; for thickets, five or six feet, or closer in particular places where a very dark shade or thick coverture of wood is required; and in clumps of trees, from five or ten to twenty feet between the trees in each clump, varying the distance occasionally, according to growth, as also the sorts and numbers of trees in each, from two or three, to five, ten, or more. The form of the clumps may sometimes be triangular, at other times quadrangular, pentangular, &c. and some in curves, others in straight lines, to cause the greater variety. And in shrubbery clumps, and wilderness compartments, where the trees and shrubs are employed promiscuously, they may be planted from five to ten feet distance; the taller growths being placed backward eight or ten feet asunder, placing the lower plants gradually forward according to their gradations, to the lowest in front, as above, at four or five feet distance: and if the trees and shrubs of the plantations in general are disposed somewhat in the quincunx way, they appear to the greater advantage, and produce a better effect.

But when large Plantations are to be formed into woods, &c. composed principally of forest and timber trees for profit, particular sorts must be chosen, consisting of deciduous and ever-green trees. Of the first kinds the oak, elm, ash, beech, chesnut, hornbeam, birch, alder, maple, sycamore, plane, poplar, lime, walnut, wild cherry, mountain-ash, larch, willow, hazel, &c. and of the latter sort, the pine, firs, cedar of Lebanon, holly, bay, laurel, yew, ever-green oak, box tree, and some others. See FOREST TREES.

In forming woods, or Plantations of timber-trees, there are two methods chiefly practised: one is by raising the trees from seed at once on the ground where the Plantation is intended to be, especially the deciduous kind, and which is effected by sowing the seed in drills, a yard asunder, the plants remaining where raised, thinning them gradually: the other method is by previously raising the plants in a nursery, till two or three feet high, then transplanting them into the places allotted them, in rows at the above distance, to allow also for gradually thinning. Either of these methods may be practised, as most convenient; but the former, or that of raising the plants where they are to remain, though it may be more expeditious, and at once gets rid of the trouble of transplanting, will require greater attendance for a few years, till the plants have shot up out of the way of weeds; but the trees, from their always remaining where raised, without being disturbed by removal, may probably make a greater progress. The latter method, or that of raising the trees first in a nursery, is rather the most commonly practised, as being thought the least troublesome and expensive, with regard to the attendance at first of the young growth.

The preparation of the ground for the final reception of the seed or plants, is mostly performed by deep ploughing and harrowing, upon such ground as the plough can be employed on; but, where this or other tillage is not practicable, only young plants from the nursery can be used, digging holes, &c. at proper distances, one for the reception of each plant: where, however, the ground can be tilled, it will prove very advantageous by performing it a year before; sowing it with a crop of turnips, or others of a similar kind; and when these come off, ploughing and harrowing the ground again, for the reception either of the seed or plants the ensuing season.

The most proper season for performing this sort of planting, either by seed or plants, is any time in dry mild weather, in the autumn, as from October till February, or later on moist soils. Where large tracts are to be planted, both the seed and plant methods must be pursued all winter, at every favourable opportunity.

The seeds may be put in, in furrows or drills one to two or three inches deep, and three or four feet asunder, scattering them along the middle of the drills, and covering the earth evenly over them, the depth of the drills or furrows; but sometimes the seeds are scattered or sown promiscuously over the general surface, and harrowed into the ground, being well protected from birds and vermin.

Where young plants are employed, they should be planted out in rows, three or four feet asunder, as directed for the seed, and one or two feet apart in the lines; they may be planted either by opening small apertures or holes with the spade for each plant; or, if very small plants, it is sometimes performed by making only a slit or crevice with the spade for each plant; and sometimes by opening or forming small trenches the whole length, then inserting the plants, one person holding whilst another trims in the earth about their roots: some again, in very large tracts, where the situation admits of previous ploughing and harrowing to divide and break the earth into small particles, open furrows with the plough, two or more persons being employed in depositing the trees in the furrow, whilst the plough following immediately with another furrow covers the roots of the plants with the earth, and afterwards treading each row upright. See PLANTING.

The grounds where the Plantations are made should be previously well fenced in all round with a deep ditch, &c. to guard against the encroachments of cattle or other animals.

In the after management, while the Plantations are young, they must have some attendance to destroy weeds, which may be expeditiously executed by hoeing between the rows in dry weather, or occasionally by horse-hoeing; and this care will be needful for two or three years, especially to the seedling plantations, until the trees are advanced out of the reach of weeds; after which no further trouble will be required until the trees are ready for the first fall or thinning, for poles, faggots, &c.

After eight or ten years growth, they are mostly of a proper size to begin the first fall by a moderate thinning, which will serve for poles and faggot-wood, to repay some of the expense of planting, &c. But only part of the Plantation should be lopped the first year; thinning out the weakest and most unpromising growth first; leaving a sufficiency of the most vigorous plants pretty close, to grow up for larger purposes; the year following thinning another part, and so continue an annual thinning-fall till the whole Plantation has been gone over; cutting each fall down near the ground, leaving the stools to shoot out again, especially in the deciduous kinds; and by the time the last fall has been made, the first will have shot up, and be ready to be cut again. So the returns of fallings may be contrived to be every six, seven, eight, or ten years, or more, according to the uses the poles or wood are wanted for: and if larger poles, &c. are wanted, the fall may be only once in fourteen, eighteen, or twenty years, still, at every fall, being careful to leave enough of the most thriving plants for standards; being left pretty close at first, that they may mutually draw each other up in height; but thinned out every succeeding fall as they increase in bulk and meet, so as to leave a sufficient quantity of the principal trees at proper distances to grow up to timber, which in their turn, as they become fit for the purposes intended, may also be felled according as there may be a demand for them, to the most advantage; having young ones from the stools coming up in proper succession as substitutes, so as the ground may be always occupied as completely as possible.

PLANTING, the operation of inserting plants, seeds, and roots, into the earth, for the purpose of vegetation and future growth.

There are various methods of performing this business in practice for different sorts of plants, seeds, and roots; as Hole Planting; Trench Planting; Trenching-in Planting; Slit or Crevice Planting; Holing-in Planting; Drill Planting; Bedding-in Planting; Furrow Planting; Dibble Planting; Trowel Planting; Planting with balls of earth about the root; Planting in pots, &c. all of which are occasionally used by different practitioners in the several branches of gardening, according as the methods are most proper for different particular sorts of plants.

In the first, or Hole Planting, which is the principal method practised with most sorts of trees and shrubs in the full ground, and which is performed by opening with a spade round holes in the earth, at proper distances, for the reception of the plants, each hole should be dug large enough to admit all the roots of the tree or shrub freely every way to their full spread, without touching the sides of the hole, and about one spade deep, or a little more or less, according to the size of the roots and nature of soil, so as, when planted, the uppermost ones may be only about three or four inches below the common surface, or as low as they were before in the ground; though in very humid soils, where the water is apt to stand, the holes should be shallower, so as the uppermost roots may stand full as high as the general level, or higher if necessary, raising the ground about them, especially when performed in winter. When the soil has been thus dug out, the bottoms should be well loosened; the mould in digging out being laid in a heap close to the edge, in order to be ready to fill in again: the holes being thus prepared, and having slightly trimmed the roots, &c. of the trees, one tree or plant must be placed in the middle of the hole, making all its roots spread equally around;

a person holding the plant erect by the stem, while another with his spade casts in the earth about the roots, taking particular care to break all large clods, and trim in some of the finest mould first all round about the roots in general, shaking the tree occasionally, to cause the fine soil to fall in close among all the small root fibres; and where the tree stands too deep, shake it up gently to the proper height; and having filled in the earth to the top of the hole, it should be trodden gently all round, first round the outside to settle the earth close to the extreme roots, continuing the treading gradually towards the stem, to which the mould should be pressed moderately firm, but no-where too hard, only just to settle the earth, and steady the plant in an upright position: then all the remaining earth should be pared in evenly round the tree, to the width of the hole, raising it somewhat above the general level of the ground, to allow for settling, giving it also a gentle treading; and finishing it off a little hollow at top, the better to receive and retain the moisture from rains, and giving occasional waterings in spring and summer, especially for the choicer kinds of trees and shrubs.

After this, in winter, or late in spring, it may be of advantage to the choicer kinds of trees and shrubs, to lay some long mulch at top of all the earth, both to keep out the winter's frost, and prevent the drying winds and drought of spring and summer from penetrating to the roots before the trees are well rooted in their new situations. But some, instead of mulch, use grass turfs turned upside down, especially when planting upon grass ground, or any out-plantations where turfs of grass can be obtained; or in orchards, where the ground is in grass; in which case it may be proper to bank some turfs round the sides and top of each hole, particularly for large trees; which will steady them more effectually, as well as preserve the moisture, if much dry weather should happen the succeeding summer.

In the second, or Trench Planting, which is a method sometimes practised in the nursery, in putting out seedling and other small trees and shrubs in rows; and also used for box edgings, as well as sometimes for small hedge-sets, &c. and always in setting out Asparagus; it is performed by opening a long narrow trench with a spade, making one side upright, then placing the plants against the upright side, and turning the earth in upon their roots. When used for young seedlings, or other small trees, shrubs, &c. the ground is previously trenched or dug over: a line is then set, and with a spade held with its back towards the line, a narrow trench six or eight inches deep is cut out, turning the earth from the line, making the line side nearly perpendicular: the plants are then inserted in the trench at small distances, close to the upright side, covering in the earth about the roots in planting them: and having planted one row, the earth should be evenly trodden in all the way along, to settle it close, and fix the plants steady, proceeding from row to row in the same manner.

But in planting larger trees in the nursery way by this method, a larger trench will be requisite: sometimes a trench one or two spades wide, with proportionable depth, according as the roots of the trees require, is made; and having opened it all the way along the intended row, the trees are placed along the middle of the trench, filling in some earth to each tree as placed, one person holding it erect whilst another throws in the earth; and having placed one row, trim in all the remaining earth evenly; then treading it closely all the way to fix the plants steady and in a perfectly upright manner.

In the third, or Trenching-in Planting, which is also sometimes practised in light pliable-working ground, for young trees in the nursery way, and sometimes with hedge-sets, &c. being performed by digging along by a line, about one spade in width, and planting at the same time; a line is set; and then having the plants ready, with a spade begin at one end, and standing side-ways to the line, throw out a spit or two of earth; which forming a small aperture, another person being ready with the plants, he directly deposits one in the opening, while the digger proceeds with the digging one spade wide, covering the roots of the plants with the earth of the next spit; and another aperture being thus formed, another plant is placed in: the digger, still proceeding, covers its roots, as before, with the next spit of earth; and so on to the end of the row, placing them at about a foot, or fifteen or eighteen inches asunder, according to the size of the plants. When larger trees with more spreading roots are used, instead of digging the trench only one spade wide, two may probably be requisite for the proper reception of the roots; likewise, in forming the openings for the plants, they should be made large enough to receive the roots freely, digging the earth over them as above. After having planted one row of plants, the earth should be trodden evenly along to settle it to the roots, and steady the plants in an upright position. There is another method of this sort of planting sometimes used for some sorts of roots, such as horse-radish sets, potatoes, &c. which is performed by common

trenching, placing a row of sets in each trench. The horse-radish should be planted in the bottom of the open trench, twelve inches in depth, turning the earth of the next over them; and the potatoe-sets be placed about from four to five or six inches deep, covering them also with the earth of the next trench.

In the fourth mode, or that of Slit Planting, which is performed by making slits or crevices with a spade in the ground, at particular distances, for the reception of small trees and shrub plants, a slit is made for each plant, which is inserted as the work proceeds; and is practised sometimes in the nursery-way, &c., in putting out rows of small plants, suckers, &c., at from about a foot to eighteen inches or two feet high, and which have but small roots: it is also sometimes practised in out grounds, where large tracts of forest-trees are planted, and which are planted out at the above sizes, and in the most expeditious and cheapest method.

It is performed in this manner: a line is set, or a mark made; and then having a quantity of plants ready, they are planted as the work proceeds in making the slits: a man, having a good clean spade, strikes it into the ground with its back close to the line or mark, forming a crevice, taking it out again directly, so as to leave the slit open, giving another stroke at right angles with the first; then the person with the plants inserts one immediately into the second-made crevice, bringing it up close to the first; and directly presses the earth close to the plant with the foot; proceeding in the same manner to insert another plant; and so on till all is finished: which is a very expeditious way of putting out small plants, for large plantations, but should never be employed where other better methods can be used.

A man and a boy in this method will plant out ten or fifteen hundred plants, or more, in a day.

In the fifth, or Holing-in Planting, which is sometimes used in the nursery, in light loose ground: also sometimes with potatoes, &c., in pliable soils; the ground being previously dug or trenched, and a line placed, it is thus performed: a person with a spade takes out a small spit of earth, to form a little aperture, in which another person directly deposits a plant, &c. The digger at the same time taking another spit at a little distance, turns the earth thereof into the first hole over the roots: placing directly another plant in the second opening, the digger covers it with the earth of a third spit, and so on to the end of the row.

In the sixth, or Drill Planting, which is by drawing drills with a hoe from two to four or five inches deep, for the reception of seeds and roots, and is a convenient method for many sorts of large seeds, such as walnuts, chesnuts, and the like; sometimes also for broad beans, and always for kidney-beans, and peas; likewise for many sorts of bulbous roots, when deposited in beds by themselves; the drills for these should be drawn with a common hoe, two or three inches deep; and for large kinds of bulbous roots, four or five inches in depth, covering in the seeds and roots with the earth, always to the depth of the drills.

In the seventh, or Bedding-in Planting, which is frequently practised for the choicer kinds of flowering bulbs, such as Hyacinths, &c., also for the larger seeds of trees, as acorns, large nuts, and other larger kinds of seeds, stones, and kernels, it is performed by drawing the earth from off the tops of the beds some inches in depth, then planting the seeds or roots, and covering them over with the earth, drawn off for that purpose; for which the ground should be previously dug or trenched over, raked, and formed into beds three or four feet wide, with alleys between; then with a rake or spade trimming the earth evenly from off the top of the bed into the alleys, from two or three to four inches deep for bulbous roots, and for seeds, one or two, according to what they are, and their size; afterwards, for bulbous roots, drawing lines along the surface of the bed, nine inches distance, placing the roots bottom downward, along the lines, six or eight inches apart, thrusting the bottom into the earth: but when for seeds, they may be scattered promiscuously; and having thus planted one bed, then with the spade, let the earth that was drawn off into the alley be spread evenly upon the bed again over the roots or seed, &c., being careful that they are covered all equally the above depth, raking the surface smooth and fine.

This method is in occasional practice, in planting several kinds of the larger prime sorts of bulbous-rooted flowers in beds; and nurserymen also practise it in planting many of their larger seeds, nuts, &c.

And another method of this kind is occasionally practised in some parts, particularly for planting potatoes in low wet grounds, which is by dividing the ground into beds, four feet wide, with alleys two or three feet in width; then digging the beds, and placing the potatoe-sets in three rows along each bed, a foot asunder in the rows: this done, the alleys are dug one spade depth, casting the soil upon the beds over the sets, so as to cover them four or five inches deep: in this way, where the ground is very wet, the alleys drain the moisture from the beds, so

as sometimes to afford great crops. Sometimes, in low moist grounds, that are in grass or sward, the beds are marked out as above, and without digging the ground; placing the potatoe sets immediately upon the sward, then digging the alleys, first turning up the sward, and placing it topsy-turvy upon the bed, so as to be sward to sward over the sets; then finishing by applying more earth from the alleys, to cover in the sets, the proper depth of four or five inches. This, in some counties, is called the lazy-bed method, because the ground is not dug over.

In the eighth, or Furrow Planting, which is by drawing furrows with a plough, and depositing sets or plants in them, covering in also with the plough: it is sometimes practised for planting potatoe-sets in fields, and has been adopted in planting young trees for large tracts of forest-tree plantations, where the cheapest and most expeditious method is required; but this method can be practised only in a light pliable ground, and is performed thus: a furrow being drawn, one or two persons are employed in placing the sets or plants in the furrow, whilst the plough following immediately with another furrow, turns the earth in upon the roots of the plants. This is not a mode to be much advised.

In the ninth, or Dibble Planting, which is the most commodious method for most sorts of fibrous-rooted seedling plants, particularly all the herbaceous tribe; also for slips, off-sets, and cuttings both of the herbaceous and shrubby kinds; likewise for some kinds of seeds and roots, such as broad-beans, potatoe-sets, Jerusalem artichokes, and horse-radish-sets, with numerous sorts of bulbous roots, &c., it is expeditiously performed with a dibble or setting-stick, by making a narrow hole in the earth for each plant, inserting one in each hole always as the work proceeds.

Having a dibble or setting-stick, it is used by thrusting it into the earth in a perpendicular descent, in depth as the particular plants, &c., may require; directly inserting the plant, seed, or set, as each hole is made, closing it immediately by a stroke of the dibble. In setting any kind of plants, slips, cuttings, &c., having long shanks or stems, it is proper to make holes a proportionable depth, to admit them a considerable way in the ground: for example, cabbage-plants, savoys, &c., should be planted down to their leaves; slips and cuttings should be inserted two parts of three, at least, in the ground; being particularly careful in dibbling-in all sorts of plants, to close the holes well in every part about the roots, by striking the dibble slantways into the ground, so as to strike the mould first firmly up to the root and fibres, at the same time bringing it close to the stem. See DIBBLE.

In the tenth mode, or Trowel Planting, it is performed with a garden trowel, made hollow like a scoop, and is useful in transplanting many sorts of young fibrous-rooted plants with balls of earth about their roots, so as not to feel their removal.

The trowel is employed both in taking up the plants, and planting them.

In the eleventh, or Planting with Balls of Earth about the Roots, which is the removing a plant with a large ball of earth about its roots, so as by having its roots firmly attached to the surrounding earth, it still, during the operation, continues its growing state, without receiving any, or but very little check from its removal: this is often practised more particularly for the more delicate and choicer kinds of exotics, both trees, shrubs, and herbaceous plants; and occasionally for many of the fibrous-rooted, flowery plants, both annuals, perennials, and biennials, even in their advanced growth and flowering state, when particularly wanted to supply any deficient compartments; though it is not so eligible for bulbous-rooted kinds: likewise, when intended to remove any sort of tree or plant out of the proper planting season, as very late in spring, or in summer, it is proper to transplant it with a good ball of earth, to preserve it more certainly in a state of growth. Some trees and shrubs are more difficult to remove with a ball than most kinds of herbaceous fibrous-rooted plants, though many of the tree and shrub kinds having very fibry roots, also readily rise with good balls.

In transplanting any of the tree and shrub kinds by this method, if they grow in the full ground, the operator must be careful to begin to open a trench with a spade at some distance from and round the stem, perhaps a foot, or two or three, according to the size of the tree and expansion of the roots, digging a sort of trench all round, a spade or two wide, or more if large trees, and in depth below all the roots; all the time having great care not to disturb the ball or mass of earth between the stem and trench, but preserve it as entire as possible. When the whole has been detached, the plant should be removed into the situation for which it is intended, with the whole of its ball about its roots.

When trees or shrubs, with balls to their roots, are intended to be sent to considerable distances, they should be placed singly in osier baskets, in order to preserve the ball; having a basket for each tree; the baskets to be of an upright make, in width and depth in proportion

to the ball, with two handles at top, especially if large, and generally worked rather open at the sides, as sometimes the basket and all is placed in the ground, when the plant cannot be readily removed without danger of breaking the ball of earth about it.

In respect to the method of planting in pots in general, having the pots and mould ready for the reception of the plants, previous to planting them place some pieces of tile, pot-sherds, or oyster-shell, &c., over each hole at the bottom of the pots, to prevent the holes being clogged and stopped with the earth, and the earth from being washed out with occasional watering; also to prevent the roots of the plants getting out: then having secured the holes, put some earth in the bottom of each pot, from two or three to five or six inches or more in depth, according to the size of the pot, and that of the roots of the plant; then insert the plant in the middle of the pot upon the earth, in an upright position, making its roots, if without a ball of earth, spread equally every way; directly adding a quantity of fine mould about all the roots and fibres, shaking the pot to cause the earth to settle close thereto: at the same time, if the root stand too low, shake it gently up; and, having filled the pot with earth, press it gently all round with the hand, to settle it moderately firm in every part, and to steady the upright posture of the plant, raising the earth however within about half an inch, or less, of the top of the pot, as it will settle lower; for some void space at top is necessaary to receive waterings occasionally: as soon as the plant is thus potted, give it directly a moderate watering to settle the earth more effectually close about all the roots, and promote their rooting more expeditiously in the new earth; repeating the waterings both before and after they have taken root, as occasion may require.

In transplanting plants in pots from one pot to another, they may in general be shifted with the whole ball of earth contained in the pot about their roots entire, so as to preserve the plant all along in its growing state, as scarcely to shrink or retard its growth by the operation; for plants growing singly in pots, and of some standing, whose roots and fibres have established themselves firmly in the earth, will readily remove out of the pots with the entire ball in one compact lump, surrounding all the roots and fibres, retaining their growing state by still drawing nourishment from the surrounding ball of earth.

The removing of plants from one pot to another with balls, is in some cases to be avoided; as where a plant appears diseased or in a bad state of growth, as it is most probable the fault is in the root or earth; therefore, it is eligible to shake the whole entirely out of the earth, in order to examine its roots, and trim off all decayed and other bad parts; then, having a fresh pot, and some entire new compost, replant the tree, &c., therein.

In potting plants from the full ground, or beds of earth, &c., if they have been previously pricked out at certain distances, and have stood long enough to fix their roots firmly, many sorts may be potted with balls, particularly most of the herbaceous, fibrous-rooted kinds, and many of the shrubby tribe, by taking them up carefully with the garden-trowel, or with a spade, as may be convenient, according to the size of the plants; and, if necessary, pare the balls round to fit the pot.

Seedling plants, or thoss raised from seed-beds, by their growing so close together, rarely admit of potting with balls to their roots; so that when it is intended to pot such, they must be drawn out of the earth with the root as entire as possible, and be potted separately in small pots, shifting them occasionally into larger.

Sometimes in pot-planting, to save room, and for other purposes, several small plants are planted in each pot, especially when designed as nursery-pots, to receive either small seedlings, off-sets, slips, cuttings, &c., just to strike them, and forward them a little at first, either in hot-beds, or for removing them to different situations, such as occasional shade, shelter, &c., and in which some sorts of small slips and cuttings are sometimes planted many together, in one or more wide pots, especially where large supplies of some particular sorts are required, such as myrtle cuttings and pipings of pinks, &c., sometimes to the amount of a hundred or two of these small sets in one capacious pot or wide store pan. The small seedlings, slips, cuttings, off-sets, &c., when they are a little forwarded, or properly rooted, and shoot a little at top, should be all potted off, in proper time, each in a separate pot, especially if plants of any duration; giving them small pots at first, and as they increase in size shifting them into larger ones.

When any large growing plants, such as orange- and lemon-trees, or any other kinds, are become too large for pots, they should be shifted into tubs: these tubs should be made of full-inch thick staves, and adapted to the size of the respective plants; each tub to be well hooped with iron, and furnished with two hooked or bow iron handles at top, by which to move them, either by hand, or, when very large tubs, to receive poles between two men for moving

the plants where wanted; having holes at the bottom of the tubs to discharge the superfluous moisture; placing some stones, &c., to prevent the holes being clogged with the earth; the method of planting and transplanting being the same as in Pot-Planting.

In the twelfth mode, or Planting in Pots, which is practised to all tender exotics, in order for moving them to shelter occasionally, such as all kinds of green-house and hot-house plants; and likewise for many sorts of hardy flowering-plants, for the convenience of moving them occasionally to adorn particular compartments; and for the convenience of moving some curious sorts when in flower to occasional shelter from the sun's rays and excessive rains, in order to preserve their beauty and prolong the time of their bloom; such as the fine auriculas, carnations, &c.

In planting in this way, it is highly requisite carefully to adapt the sizes to the size and nature of the different plants intended to be potted: if small plants, begin first with small pots, one plant only to each pot, especially if to remain; but according as the different plants advance in growth shift them into pots one or two sizes larger, which may be requisite to many sorts once a year, to others once in two or three years, according to circumstances.

Garden-pots for this use are of several regular sizes, from two to sixty in a cast, distinguished at the pot-houses accordingly; as twos, sixes, twelves, sixteens, twenty-fours, thirty-twos, forty-eights, sixties, or sixty-fours, &c., each pot having one or more apertures at bottom to discharge the superfluous moisture. They are sold by the potters at so much per cast, large and small, all of a-price; those of only two in a cast the same as those of sixty; and from two shillings to half a crown or three shillings per cast is the general price. See Pot, Garden.

Sometimes, instead of baskets, small young trees and other plants with balls, intended to be sent to any distance, are put separately in pots, and when they are to be placed in the full ground, each should be turned out of the pot with the ball entire.

Trees and other plants that have generally grown in pots, where they have been of some standing, have the whole earth by means of the numerous fibres formed into one compact lump, so that it will readily come out entire and firm; or to such as do not so easily quit the pot, a long blade of a knife, or some other thin instrument, may be thrust down between the outside of the ball and pot all round, and it will then readily come out, either in drawing by the stem of the plant, or by striking the edge of the pot with something; or, if small plants, you may turn the pot mouth downward, and strike the edge gently against any firm substance. In replanting those potted plants, if the sides of the ball of earth is much matted with the fibres of the root, it is proper to pare off the grossest part, together with a little of the old earth, especially if to be planted in pots again; then put it in a pot a size larger than before, filling up all round with fresh mould, finishing with a moderate watering.

In regard to the proper state and preparation of trees for planting, it may be observed that young trees, both of the fruit and forest kinds, are the most suitable, and succeed best; as from three or four to six or eight feet in height, and from three or four to five or six years old. See Forest-, Dwarf-, and Standard-Trees.

In forest-trees, the straightest, most vigorous, and thriving plants of the respective kinds should always be chosen.

In preparing for planting, in taking up the trees out of the nursery, the greatest care is necessary in raising them with as great a spread of roots as possible, which is often ill attended to, especially when large orders of plants are to be drawn in a hurry. The ground about the trees should always be opened with the spade widely round the roots, and deep enough to get to their bottom without hacking and cutting them with the spade, but so as to raise each plant with all its roots as entire as possible. After having taken up the trees out of the nursery, &c., it is also of great moment to have them replanted as soon as possible in the places allotted for them; for, although by properly covering the roots with litter, or, if sent to any considerable distance, by tying them in bundles, and packing them up with plenty of straw about the roots, and afterwards closely matted round, they may be preserved in tolerable good condition a fortnight or longer—yet, where it is possible to plant them the same day, or in a day or two after, before the small fibres are shrunk or dried, it will be of much advantage in the first growth of the trees; but when this cannot be done they should be immediately laid in the ground in a trench.

In preparing for planting, the roots must have an occasional trimming, not however to retrench or reduce any but the maimed and decayed parts; therefore previous to planting examine the root, and cut out all such parts as have been broken or damaged in taking up, and any casual decayed parts or other blemishes, being careful to leave all the sound roots every where entire; leaving also all the small fibres that are fresh and vigorous, only trimming off

such as are become dry and mouldy; suffering all the main roots to remain, mostly at full length, except just to tip off their ends a little on the under side, sloping outward; and reduce any very long stragglers, and shorten long perpendicular tap-roots, more particularly of fruit-trees, to prevent their running down into a bad soil, and to promote their throwing out others horizontally.

And with regard to the preparation of the heads of the trees, the principal care is to trim off the straggling shoots and branches from the stems, leaving the heads for the generality entire, only just retrenching very irregular branches, and shortening any very long stragglers; always suffering the main or leading top shoot to remain at length, particularly in forest-trees, and all others that are to grow to a lofty stature.

Fruit-trees, however, sometimes require a more accurate regulation of the head preparatory to planting, particularly dwarfs for espaliers and walls. If the fruit-tree is taken from the nursery at one year old from the budding and grafting, and with its first shoot from budding and grafting entire, this first shoot must necessarily be shortened or headed down to force out lateral wood below, to furnish the bottom properly; but this heading down is not necessary at the time of planting, but should remain till spring, until the tree has taken fresh root and begins to shoot; for the head remaining greatly promotes the rooting; when in March or the beginning of April, head it down within half a foot, or five or six eyes of the insertion of the bud or graft, and the shoot so headed will throw out, from its remaining lower eyes, several lateral branches the ensuing summer.

If it is two, three, or more years old from the budding and grafting, and the first shoots were headed down in the nursery at the proper time, it is proper to plant it with its whole head entire, only retrenching any irregular branch, or any very luxuriant shoot; or thin out the worst of such as are evidently too close or crowded, leaving however all the regular branches at full length, except just to reduce any very long rambler.

For new planting trees it is very improper to retrench the branches too severely, and cut all that remains short, as is very often practised, on a supposition of strengthening their roots, which however has often the contrary effect; for the branches and leaves imbibe the refreshing influence of the air, &c., which, being conveyed to the roots, proves nutrimental, and contributes exceedingly towards vegetation, and consequently promotes the rooting afresh more expeditiously and effectually. Besides, by a severe retrenching and a general shortening, of fruit-trees in particular, in most sorts the very parts where fruit would have been soon first produced are cut off, and it will probably cost the tree two or three years growth to furnish new branches equal to those cut away, as well as retard its bearing in proportion. And it often happens by such a general amputation of the branches of all new planted trees at the time of planting, that they, for want of branches to collect vegetative nourishment, either make very little progress in shooting for two or three years after, or sometimes, when they do shoot, throw out a profusion of unnecessary wood from the remaining eyes or buds.

Therefore if young fruit-trees at planting, whether dwarfs or standards, are furnished with five or six or more good regular principal branches, of one, two, or more years growth, it is improper to retrench any part of them, and disfigure the tree, particularly apples, pears, plums, and cherries, which should at all times be but sparingly shortened; and since several good branches being already obtained in the proper parts to give the head its first regular form, they in their turn readily furnish more; and if there is a vacancy in any part, it will be better to endeavour to fill it by stopping some of the young shoots produced the summer after planting, by either pinching or pruning them in May or June the same year to three or four eyes, or cutting them down to that length in the winter or spring following.—Some fruit-trees, however, such as peaches, nectarines, &c., against walls, require most of their young shoots to be shortened annually.

Forest-trees, &c., in their preparation previous to planting, after being drawn out of the nursery, should only have the blemished roots trimmed, and all branches from the lower part of the stem pruned off, cutting the lower ones close, the others to two, three, or four inches, particularly the deciduous kinds, leaving the head always tolerably branchy, and mostly entire; not to trim away all the branches to one leading shoot only, as is often practised, but leave a proportionable share of the upper more erect branches, to form some tolerable head, and only just retrenching the lower stragglers, very long rambling luxuriants, and very irregular growths, to preserve a little regularity; being particularly careful to leave always the top or leading shoot perfectly entire, unless it is decayed, or is very crooked, bending much downwards, &c., in which cases, if any straight shoot is conveniently situated, the crooked part may be retrenched down to the straight shoot, which leave entire to run up in height, as with-

out a leader a tree can never aspire to any considerable stature; for the leader, by its annual erect shoot, gradually increases the length of the stem, and, as it advances, sends out a supply of laterals to furnish the head, branching and spreading.

In planting tall trees, where it is designed to form shade, shelter, or blind as soon as possible, very little reduction of the branches of the head should be suffered, only to reduce any very irregular growers.

In removing pretty large trees of any sort with considerable heads, especially when very spreading or crowded, it may be proper to reduce the whole regularly in some proportion to the root, that the winds may not have too much power to incommode it after planting; in which cases it may be necessary to retrench or reduce some of the most extensive lower branches, and thin out some where much crowded, reducing others down to some convenient lateral branch they may support, so as each reduced branch may, notwithstanding its reduction, terminate in a leader, having its top entire, not to exhibit naked ends of branches, standing up like stumps.

In respect to the preparation for planting of all the shrub kind, only just trim the straggling under branches and shoots from the lower part of the stem, retrenching any luxuriants of the heads that seem to shoot away very irregularly and vigorously at the expense of the neighbouring branches, and reducing long ramblers, &c., just to preserve a little regularity.

All new planted tall trees should be staked as soon as planted, in order to support them steady every where till they are well rooted and have somewhat established their roots, that winds may not overset, or otherwise incommode them; particularly all trees of six, eight, or ten feet high, and upwards; one tall stout stake being placed to each tree, or more, if the trees are of large size, sharpening the lower ends, and driving them firmly into the ground near the stem; or if larger trees, place it slantways, at a little distance, so as its top reach the upper part of the stem, on the opposite side to that most exposed to the winds, in which it will have the greatest effect; but large trees with full heads, should generally have very tall strong stakes, three to each tree, placed triangular-ways, in an oblique or slanting direction, afterwards binding the stems of the trees firmly to the stakes, previously wrapping some soft substance, such as hay-bands, &c., round them, at the part where it is to be fastened to the stakes, in order to save the bark from being rubbed off against the stakes by the motion of the winds, which is more particularly necessary to tall plants that are much exposed.

Large trees of considerable stature, with full heads, are often supported with ropes suspended from the top of the stem three different ways, straining them tight, and the end of each rope staked securely down to the ground; so that whatsoever way the wind blows the ropes stay the tree still in its upright position.

Such new planted trees as are exposed to cattle should each be well fortified all round the stem with thorn bushes.

The general season of planting, for all sorts of trees, is autumn and spring, as from the beginning of the decay of the leaf, in October, until December, for the former; though evergreens may be begun to be transplanted towards the middle or latter end of September and continued till December. And for the spring planting, February and March is the principal time, but may be continued occasionally until April; and several sorts of tender young evergreens succeed best when planted the beginning of that month, or later. Much, however, in this business, must depend on the soil and state of the weather.

In preparing to plant herbaceous fibrous-rooted plants, care is to be had to remove them with good roots; young seedlings, &c., especially require particular care in drawing them with proper roots. When they are to be taken all clean up, they may be readily loosened and raised out of the earth with some instrument with all their fibres entire; but when they are only to be thinned, they do not admit of this, as it would disturb the remaining plants, so must be drawn out by hand carefully, with as much root as possible.

Many sorts of fibrous-rooted plants, however, are so hardy, and apt to grow, that if taken up almost any how, with a little root, they will strike: it is nevertheless advisable to use care in drawing all sorts for planting with tolerable roots, as they will in proportion make more progress in their future growth. And as to any trimming preparatory to planting, very little is wanted, only in some sorts, just shortening very long naked spindly roots, and trimming any straggling fibres; though in numbers of plants of this tribe hardly any trimming at all is required, either in root or top.

PLATANUS, a genus containing plants of the exotic deciduous tree kind.

It belongs to the class and order *Monoecia Polyandria*, and ranks in the natural order of *Amentaceæ*.

The characters are: that the male flowers are compound, forming a globular ament. The

calyx is a few small jags. The corolla scarcely apparent: the stamina have oblong filaments, thicker at top, coloured: anthers four-cornered, growing round the filament at the lower part—female flowers forming a globe, numerous, on the same tree: the calyx has many very small scales: the corolla has many petals, concave, oblong, club-shaped: the pistillum many awl-shaped germs, ending in awl-shaped styles; with a recurved stigma: there is no pericarpium: fruits many, collected into a globe: the seed roundish, placed on a bristle-shaped peduncle, and terminated by the awl-shaped style; with a capillary pappus adhering to the base of the seed.

The species are: 1. *P. orientalis*, Oriental Plane Tree; 2. *P. occidentalis*, American Plane Tree.

The first has the stem tall, erect, and covered with a smooth bark, which annually falls off; it sends out many side branches, which are generally a little crooked at their joints; the bark of the young branches is of a dark brown, inclining to a purple colour; the leaves are placed alternate, on foot-stalks an inch and a half long; the leaves themselves are seven inches long and eight broad, deeply cut into five segments, and the two outer are slightly cut again into two more; these segments have many acute indentures on their borders, and have each a strong midrib, with many lateral veins running to the sides; the upper side of the leaves is of a deep green, and the under side pale. The flowers come out upon long peduncles hanging downward, each sustaining five or six round balls of flowers; the upper, which are the largest, are more than four inches in circumference; these sit very close to the peduncle. The flowers are so small as scarely to be distinguished without glasses; they come out a little before the leaves, which is in the beginning of June; and in warm summers the seeds will ripen late in autumn, and if left upon the trees will remain till spring, when the balls fall to pieces, and the bristly down which surrounds the seeds helps to transport them to a great distance with the wind. It is a native of Asia.

There are two varieties, as the Maple-leaved, which has not its leaves so deeply cut as those of the eastern plane: they are divided into five segments, pretty deep, but are not lobed, like those of the occidental plane. The petioles are much longer than in either of the species, and the upper surface of the leaves is rougher, so that they might be taken for different sorts, if it was not known that they rose from the same seeds.

The Spanish Plane, which has larger leaves than either of the sorts, and are more divided than those of the occidental, but not so much as those of the oriental. Some of the leaves are cut into five, and others into three lobes only; these are sharply indented on the edges, and are of a light green; the footstalks are short, and covered with a short down. This is by some called the Middle Plane Tree, from the leaves being of a shape between the two species.

These are highly ornamental trees for pleasure-grounds.

The second species grows to a large size, the stem very straight, and of equal girth most part of the length; the bark is smooth, and annually falls off like that of the former; the branches extend wide on every side; the young ones have a brownish bark, but the old ones a gray bark; the footstalks of the leaves are three inches long; the leaves are seven inches long, and ten broad; they are cut into three lobes or angles, and have several acute indentures on their borders, with three longitudinal midribs, and many strong lateral veins. The leaves are of a light green on their upper side and paler on their under. The flowers grow in round balls like the former, but are smaller. The leaves and flowers come out at the same time with the former, and the seeds ripen in autumn. It is a native of most parts of America.

This is also an ornamental tree in the same situations.

Culture.—These plants may be increased by seed, layers, and cuttings; but principally in the two last methods.

The best season for sowing the seeds is autumn, if they can be procured, otherwise in the spring, upon a somewhat lightish, mellow soil: the ground having been dug and raked, it should be formed into four-feet wide beds, and the seeds then scattered evenly on the surface, and raked in, or with the back of a rake the earth be previously trimmed off the surface near half an inch deep into the alleys; then sowing the seed, and directly, with the rake turned the proper way, drawing the earth evenly over the seeds, and trimming the surface smooth, when many of the plants will rise in spring, but probably not generally till the spring following. When they are one or two years old, they should be planted out in nursery-rows, two feet asunder, and about half that distance in the lines; to remain till of a proper size for being finally set out.

In the layer method, some stout plants must be planted for stools, which in a year after must be headed down near the bottom, that they may throw out many shoots near the ground convenient for laying; which, in the autumn after

they are produced, should be laid down by slit-laying; and by the autumn after, they will be well rooted, and form plants two or three feet high, which may be separated, and planted in nursery-rows, as the seedlings. They succeed very readily in this way.

Most of the sorts take tolerably by cuttings of the strong young shoots; but the latter more freely than the former kinds. The most proper season for planting them is the autumn, as soon as the leaf falls, or occasionally in the spring; choosing a moist soil for the purpose, when many of the cuttings will grow, and make tolerable plants by the autumn following.

These last two methods are the only ones in order to continue the distinct varieties effectually.

They have a very ornamental effect in all sorts of plantations, from their large growth and the great size of their leaves.

PLEASURE-GROUND, any ornamented ground round a residence. It comprehends all the ornamental compartments or divisions of ground and plantation; such as lawns, plantations of trees and shrubs, flower compartments, walks, pieces of water, &c., whether situated wholly within the space generally considered as pleasure-ground, or extended over haha's, or by other communications, to the adjacent fields, parks, paddocks, or out-grounds.

In designs for pleasure-grounds, modern improvements reject all formal works, such as long straight walks, regular intersections, square grass plots, corresponding parterres, quadrangular and angular spaces, inclosed with high clipped hedges, &c., as well as all other uniformities; instead of which, open spaces of grass ground of varied forms and dimensions, and winding walks, all bounded with plantations of trees, shrubs, and flowers, in various clumps and other distributions, are exhibited in a variety of imitative rural forms, as curves, projections, openings, and closings, in imitation of a natural assemblage, having all the various plantations open to the walks and lawns. A spacious open lawn of grass ground being generally first exhibited immediately in the front of the mansion, or main habitation, sometimes widely extended in open space on both sides to admit of greater prospect, &c., and sometimes more contracted towards the habitation, widening gradually outward, and having each side embellished with plantations of shrubbery, groves, thickets, &c., in clumps, and other parts, in sweeps, curves, and projections, towards the lawn, &c., with breaks or openings of grass spaces at intervals, between the plantations; and serpentine gravel-walks winding under the shade of the trees: extended plantations being also carried round next the outer boundary of the ground, in various openings and closings, having also gravel-walks winding through them, for shady and private walking; and in the interior divisions of the ground serpentine winding walks exhibited, and elegant grass opens, arranging various ways, all bordered with shrubberies, and other tree and shrub plantations, flower compartments, &c., disposed in a variety of different rural forms and dimensions, in easy bendings, concaves, projections, and straight ranges, occasionally; with intervening breaks or openings of grass ground, between the compartments of plantations, &c., both to promote rural diversity, and for communication and prospect to the different divisions; all the plantations being so variously arranged, as gradually to discover new scenes, each furnishing fresh variety, both in the form of the design in different parts, as well as in the disposition of the various trees, shrubs, and flowers, and other ornaments and diversities.

So that in these designs, according to modern gardening, a tract of ground of any extent may have the prospect varied and diversified exceedingly, in a beautiful representation of art and nature, so that in passing from one compartment to another, new varieties present themselves in the most agreeable manner; and even if the figure of the ground be irregular, and its surface has many inequalities, in risings and fallings, and other irregularities, the whole may be improved without any great trouble of squaring and levelling, as, by humouring the natural form, even the very irregularities may be made to conceal their natural deformities, and carry along with them an air of diversity and novelty. In these rural works, however, we should not entirely abolish all appearance of art and uniformity; for these, when properly applied, give an additional beauty and peculiar grace to all natural productions, and sets nature in the fairest and most advantageous point of view. One principal point in laying out a pleasure-ground, is for the designer to take particular care that the whole extent of his ground be not taken in at one view, as where the contrary is the case there is a tameness and want of proper effect produced.

It is impossible to give any directions for planning a pleasure-ground; as the plan may be varied exceedingly, according to the natural figure, position, and situation of the land, and taste of the designer.

In respect to the situation, it must be immediately contiguous to the main house, whether high or low situated: however, a somewhat elevated situation, or the side or summit of some moderate rising ground, is always the most

eligible on which to erect the chief habitation, arranging the pleasure-ground accordingly; such an exposure being the most desirable, both for the beauty of the prospect and heathfulness of the air; a low level situation neither affording a due prospect of the ground, or the adjacent country, besides being liable to unwholesome dampness, and sometimes inundation in winter: there are, however, many level situations, forming plains or flats, that possess great advantages both of soil and prospect, and the beauties of water without too much moisture; there are also sometimes large tracts of ground, consisting both of low and high situations, as level plains, hollows, eminences, declivities, and other inequalities, which may be so improved as to make a most desirable pleasure-ground, as the scene may be varied in the most beautiful manner imaginable; but as the choice of situation and scope of ground is not always attainable, every one must regulate his plan in the most commodious manner possible, agreeable to the nature of the particular situation, extent of ground, and plan which has been adopted.

The extent of pleasure-grounds may be various, according to that of the estate or premises, and other circumstances, as from a quarter or half an acre to thirty or forty or more.

The ground for this purpose should previously be well fenced in, by a wall, paling, hedge, or parts of each sort, and in some parts a fosse or ha-ha, where it may be necessary to extend the prospect, either at the termination of a lawn, walk, or avenue; and the close fences should generally be concealed withinside, particularly the wall and paling fences, by a range of close plantation, unless where the wall may be wanted for the culture of wall-fruit. But sometimes, when the pleasure-ground adjoins to a fine park, paddock, or other agreeable prospect, the boundary fence on that side is often either a low hedge, or a ha-ha; but many prefer the latter, especially at the termination of any spacious open, both to extend the prospect more effectually, and give the ground an air of greater extent than it really has, at a distance; the ha-ha being sunk, nothing like a fence appears, so that the adjacent park, fields, &c., appear to be connected with the grounds.

The arrangement of the several divisions, both internal and external, must be wholly regulated by the nature and extent of the ground.

And in whatever mode such grounds are laid out, the whole of the different quarters, walks, and other parts, should be kept in an exact and neat order.

PLIANT MEALY TREE. See VIBURNUM.

PLINIA, a genus comprising a plant of the exotic shrubby kind for the stove.

It belongs to the class and order *Icosandria Monogynia*, and ranks in the natural order of *Rosaceæ*.

The characters are: that the calyx is a one-leafed perianth, five- or four-parted: segments acute, flat, small: the corolla five- or four-petalled: petals ovate, concave: the stamina have numerous capillary filaments, the length of the corolla: anthers small: the pistillum is a superior, small germ: style awl-shaped, longer than the stamens: stigma simple: the pericarpium is a very large drupe, globular, grooved: the seed single, very large, globular, smooth.

The species is *P. pedunculata*, Red-fruited Plinia, or Myrtle.

It has the leaves opposite, petioled, simple, even, like those of myrtle, ovate: the flowers are peduncled, the length of the leaves, subumbelled: the calycine leaflets four, ovate, concave, spreading, coloured, reflex: the petals, four or eight, obovate, sessile, twice as long as the calyx: the filaments very many, capillary, the length of the petals, inserted into the receptacle: anthers roundish: germ inferior, roundish angular: the style filiform, the length of the stamens: the stigma simple: the berry roundish, the size of a plum, with eight swellings, one-celled, umbilicated, with a four-toothed calyx, red and sapid: seed single, sub-globular. It is a native of Brasil, flowering in January and February.

Culture.—It is increased by the seeds, which should be procured from abroad, and which should be sown in pots, filled with rich mould, plunging them in a bark hot-bed, when they appear in the same season. They may also be increased by planting cuttings of the young shoots, in the later spring and summer months, in pots filled with good earth, covering them with hand- or bell-glasses, and watering them occasionally. They may be so rooted as to be fit for removing into separate pots the same year.

It is highly ornamental in stove-collections, from its flowering in the winter season.

PLUM. See PRUNUS.

PLUM, MAIDEN. See CAMOCLADIA.

PLUMBAGO, a genus containing plants of the herbaceous flowering perennial kinds.

It belong to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Plumbagines*.

The characters are: that the calyx is a one-leafed perianth, ovate-oblong, tubular, five-cornered, rugged, with a five-toothed mouth, permanent: the corolla one-petalled, funnel-form: tube cylindrical, narrower at top, longer

than the calyx: border five-cleft, from erect-spreading, with ovate segments: nectary of five very small acuminate valves in the bottom of the corolla, inclosing the germ: the stamina have five, awl-shaped filaments, free within the tube of the corolla, placed on the valves of the nectary: anthers small, oblong, versatile: the pistillum is an ovate germ, very small: style simple, the length of the tube: stigma five-cleft, slender: the pericarpium is an oblong capsule, five-cornered, terminated by the permanent style, one-celled, five-valved, clothed with the calyx: the seed single, oblong, fastened to a thread, pendulous.

The species cultivated are: 1. *P. europæa*, European Leadwort; 2. *P. zeylanica*, Ceylon Leadwort; 3. *P. rosea*, Rose-coloured Leadwort; 4. *P. scandens*, Climbing Leadwort.

The first has a perennial root, striking deep into the ground: the stalks many, slender, three feet and a half high, and channelled: the leaves three inches long and two broad, smooth, entire, of a grayish colour. The upper part of the stalks send out many slender side branches, which have small leaves on them: these and also the principal stalks are terminated by tufts of either blue or white flowers, which are small and succeeded by rough hairy seeds. It is a native of the South of Europe and Africa, flowering here in October.

The second species is a perennial plant, with a strong fibrous root, from which arise many slender stalks, growing near four feet high: the leaves about three inches long, and an inch and half broad near their base, ending in acute points; they are alternate, and on short footstalks: the upper part of the stalks divides into small branches, having smaller leaves on them, and terminating in spikes of flowers: seeds covered with the prickly calyx: the upper part of the stalks and the calyx of the flowers are very glutinous, sticking to the fingers, and entangling small flies that settle on them. It is a native of the East Indies and of the Society Isles, flowering from April to September.

The third is a shrubby plant, which frequently grows to the height of four or five feet, and is perpetually putting forth flowering spikes; these continue a long time, and hence, with proper management, may be kept in flower during most part of the year. The calyx has capitate glutinous hairs scattered over it: the filaments are dilated at the base and arched: the capsule superior, clothed with the permanent calyx, ovate-oblong, ending in the subulate-setaceous style, obscurely five-cornered: the seed oblong, acuminate above, of a dark blood-red or ferruginous colour, suspended by a filiform umbilical chord, springing from the base of the capsule. It is a native of the East Indies.

The fourth species has a suffrutescent stem, scandent, sometimes decumbent, loose, flexuose, branched, round, striated, smooth: the leaves are alternate, ovate-lanceolate, acuminate, nerved, spreading, entire, smooth on both sides: two smaller leaflets at the base of the middle, and two above it: the petioles very short, compressed, channelled, half embracing, membranaceous at the edge, with a red spot at the base underneath: the flowers terminating, subpanicled, commonly in spikes, sessile, scattered, approximating: the leaflets sessile under the flowers; the calyx inferior, bellying in the middle and towards the base, five-grooved, with glanduliferous hairs: the border of the corolla five-parted: parts roundish, emarginate, with a very short point in the middle: the nectariee roundish, yellow, round the germ, inserted into the bottom of the calyx: the filaments thickened, approximating, awl-shaped: anthers placed on the top of the filaments, blue: style the length of the stamens: seed coated, as it were included in a capsule, and covered with the permanent calyx. It is a native of South America and Jamaica, flowering in July and August.

Culture.—The first sort is increased by parting the roots in the autumn, when the stems decay, and planting them in a dry soil. They should afterwards be kept clean from weeds, and have proper support.

The three other sorts should be raised from seeds, which should be sown in pots, in the spring, and plunged in hot-beds. They likewise may sometimes be raised by planting slips and cuttings in pots, and plunging them in the same sorts of hot-beds.

These are all ornamental flowering plants; the first in the pleasure-grounds, and the others in pots among hot-house collections.

PLUMERIA, a genus containing plants of the succulent flowering exotic kind, for the stove.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Contortæ*.

The characters are: that the calyx is a five-parted perianth, blunt, very small: the corolla one-petalled, funnel-form: tube long, widening gradually: border five-parted, from erect-spreading; segments ovate-oblong, oblique: the stamina have five, awl-shaped filaments, from the middle of the tube: anthers converging: the pistillum is an oblong, bifid germ: styles scarcely any: stigma double, acuminate: the pericarpium consists of two follicles, long, acuminate, ventricose, bent downwards, nodding, one-celled, one-valved: the seeds numerous,

oblong, inserted into a larger ovate membrane at the base, imbricate.

The species are: 1. *P. rubra*, Red Plumeria, or Jasmine; 2. *P. alba*, White Plumeria; 3. *P. obtusa*, Blunt-leaved Plumeria; 4. *P. pudica*, Close-flowered Plumeria.

The first rises to the height of eighteen or twenty feet: the stalks are covered with a dark green bark, having marks where the leaves are fallen off; they are succulent, abound with a milky juice, and within are somewhat woody: towards the top they put out a few thick succulent branches, with leaves at their ends of a light-green colour, full of milky juice, having a large midrib and many transverse veins: at the ends of the branches also come out the flowers in clusters; shaped like those of the Oleander or Rose-bay, of a pale-red colour, and having an agreeable odour. They are produced in this climate in July and August.

The second species has the habit of the first, but is not much branched, and rarely exceeds fifteen feet in height; it abounds, like that, in a milky juice: the flowers are in spikes, white with a yellowish eye, and diffuse a very sweet odour to a considerable distance. It is a native of Campeachy.

The third produces small white flowers resembling those of the second: the leaves are oval-lanceolate, and the peduncles branched. Some describe it as a thick tree, exceeding the middle size, with an ash-coloured, smooth, milky bark, a juicy brittle wood, and spreading, thick, twisted branches: the leaves quite entire, large, flat, smooth, scattered, with many transverse ribs: the flowers terminating, in compound spreading upright racemes. It is a native of the West Indies.

The fourth species is an uprigdt milky shrub, five feet in height, of the same habit with the others: the leaves oblong, flat, veined: the flowers numerous, yellowish, the border continuing erect and shut, even after they drop; being rolled up like the flowers of Hibiscus: they succeed each other continually for two months together; and have an odour much more agreeable than that of the preceding species, or even of any other known flower. It is a native of South America.

Culture.—These plants are capable of being increased by seeds and cuttings of the young branches.

The seeds should be procured from the native situation of the plants, and be sown in pots, filled with a light sandy compost, plunging them in a hot-bed, covered by glasses, or the bark-bed in the stove, when they readily vegetate; and when the plants have attained a few inches in growth, they should be removed into separate pots, of a small size, which must be plunged in beds of the same kind as the above.

The cuttings should be made from the young branches, and after being laid in the stove or some other dry situation, to dispel their succulence, and heal over the wounds, be planted out during the summer months, in pots, filled with light dry mould, plunging them in the bark-bed of the stove, giving occasional shade and very slight waterings, till they have stricken fresh root, and when they have become well rooted, they may be removed into separate pots, being managed as other stove exotics.

They afford much ornament and variety among collections of stove plants; especially the red sort; and when set out with other potted plants in the summer, have a delightful fragrance.

POISON-ASH. See Rhus.

POISON-NUT. See Strychnos.

POISON-OAK. See Rhus.

POLEMONIUM, a genus containing plants of the fibrous-rooted, herbaceous flowering perennial kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Campanaceæ*.

The characters are: that the calyx is a one-leafed perianth, half-five-cleft, inferior, goblet-shaped, acute, permanent: the corolla one-petalled, wheel-shaped: tube shorter than the calyx, closed by five valves placed at the top: border five-parted, wide, flat: segments roundish, blunt: the stamina have five filaments, inserted into the valves of the tube, filiform, shorter than the corolla, inclining: anthers roundish, incumbent: the pistillum is an ovate, acute, superior germ: style filiform, the length of the corolla: stigma trifid, revolute: the pericarpium is a three-cornered capsule, ovate, three-celled, three-valved, opening three ways at top, covered: partitions contrary to the valves: the seeds very many, irregular, sharpish.

The species are: 1. *P. cæruleum*, Common Polemonium; 2. *P. reptans*, Creeping Polemonium, or Greek Valerian.

The first has a perennial, fibrous root: the herb smooth: the stems upright, rising to the height of eighteen or twenty inches, seldom more, leafy, panicled: the leaves alternate, unequally pinnate, many-paired; leaflets elliptic-lanceolate, quite entire: the corolla between bell-shaped and wheel-shaped, blue: the calyx bell-shaped, half-five-cleft: the filaments dilated at the base and membranaceous: capsule clothed with the calyx, ovate-globular, obsoletely three-grooved, thin, subpellucid: seeds

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1 *Philadelphus coronarius*
Syringa or Mock Orange

2 *Polemonium caeruleum*
Blue Greek Valerian

six in each cell, in a double row, fastened to the inner angle of the cell, variously angular, eroded on the surface, of a dark rust colour. It is a native of Asia, flowering in May.

There are varieties with white flowers, with variegated flowers, and with variegated leaves.

The second species has creeping roots, by which it multiplies very fast. The leaves have seldom more than three or four pairs of leaflets, which stand at a much greater distance from each other than those of the common sort, and are of a darker green. The stalks rise nine or ten inches high, sending out branches their whole length. The flowers are produced in loose bunches, on pretty long peduncles; they are smaller than those of the common sort, and of a lighter blue colour. It is a native of America.

Culture.—These plants may be increased by seeds and parting the roots.

The seeds should be sown in the spring, upon a bed of light earth, and when the plants are pretty strong they should be pricked out into another bed of the same earth, four or five inches asunder, shading and watering them until they have taken new root; keeping them clear from weeds until the beginning of the autumn, and then transplanting them into the borders of the pleasure-ground. The plants are not of long duration; but by taking them up in autumn and parting their roots they may be continued some years: but the seedling plants flower stronger than those from offsets.

The varieties can only be continued by parting the roots at the above season. They should have a fresh light soil, which is not too rich, as the roots will be apt to rot in winter, and the stripes on the leaves to go off.

The second sort may be increased by seeds or offsets in the same manner, and is equally hardy, but much less beautiful.

They afford ornament among flowery plants in the borders and other parts.

POLEY-MOUNTAIN. See Teucrium.

POLYANTHES, a genus containing plants of the bulbo-tuberous rooted herbaceous flowering perennial exotic kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Coronariæ*.

The characters are: that there is no calyx: the corolla one-petalled, funnel-form: tube curved inwards, oblong: border patulous, with six ovate segments: the stamina have six filaments, thick, blunt, at the jaws of the corolla: anthers linear, longer than the filaments: the pistillum is a roundish germ, at the bottom of the corolla: style filiform, mostly shorter than the corolla: stigma trifid, thickish, melliferous: the pericarpium is a roundish capsule, obtusely three-cornered, at the base involved in the corolla, three-celled, three-valved: the seeds very many, flat, incumbent, in a double row, semi-orbiculate.

The species is *P. tuberosa*, Tuberose, or Indian Tuberous Hyacinth.

It has an oblong bulb-like tuberous root, which is white, sending forth a few long but very narrow leaves, and an upright, firm, straight stem, of considerable length, which is terminated by a long spike of large white flowers, placed in an alternate manner. It is a native of India.

There are varieties with a double flower, with striped leaves, and with a smaller flower. The last is frequent in the south of France, whence the roots have been often brought here early in the spring, before those roots have arrived from Italy which are annually imported; the stalks of it are weaker, and do not rise so high, and the flowers are smaller than those of the common sort, but in other respects it is the same.

The Genoese are the people who cultivate this plant to furnish all the other countries where the roots cannot be propagated without great trouble and care, and thence the roots are annually sent to this and other countries. In most parts of Italy, Sicily, and Spain, the roots thrive and propagate without care where they are once planted.

It has been long cultivated in this country for the exceeding beauty and fragrancy of its flowers.

Culture.—These plants are chiefly increased by off-sets from the roots.

The blowing roots that are annually brought from abroad, for sale, are mostly furnished with off-sets, which should be separated previously to planting; those also raised here in the garden are frequently furnished with off-sets, fit for separation in autumn, when the leaves decay. They should be preserved in sand during winter, in a dry sheltered place; and in the beginning of the spring, as March, be planted out either in a bed of light dry earth in the full ground, or, to forward them as much as possible, in a moderate hot-bed, sheltering them in cold weather either by a frame and lights or with mats on arched hoops, letting them enjoy the full air in mild weather, giving also plenty of water in dry seasons during the time of their growth in spring and summer.

They should remain in this situation till their leaves decay, in autumn; then they should be taken up, cleaned from earth, and laid in a box of dry sand, to preserve them till spring following, at which time such roots as are

large enough to blow may be planted and managed as directed below, and the smaller roots planted again in a nursery-bed, to have another year's growth; afterwards planting them out for flowering.

The roots of these plants are mostly sold at the rate of about twelve or fifteen shillings per hundred, care being taken always to procure as large roots as possible, as on this depends the success of having a complete blow.

In order to blow them in a perfect manner, they require artificial heat in this climate, and should be planted in pots, and plunged in a hot-bed, under a deep frame, furnished with glass lights; or placed in a hot-house, where they may be blowed to the greatest perfection, with the least trouble.

The principal season for planting them is as above; but in order to continue a long succession of the bloom it is proper to make two or three different plantings, at the interval of about a month.

Where dung hot-beds are employed, six inches depth of earth, or old tan, should be laid, in which to plunge the pots; but if bark or tan be used, no earth is necessary, as the pots may be plunged immediately into the bark. Having the hot-beds ready, and the roots provided, and some proper sized pots, twenty-fours, one for each root, fill the pots with light rich earth; and, after having divested the roots of all loose outer skins, and all off-sets, plant one in each pot, in depth, so as the top of the root be about an inch below the surface of the earth, plunging all the pots in the hot-bed close together, or so that the bed may contain the number required; and as soon as they are all thus placed, put on the lights of the frame.

In the hot-house method, the pots of roots as above should be plunged to their rims in the bark-bed, or placed in the front part of the house; but the former is the better method.

They afterwards require to have a portion of fresh air daily admitted, by tilting the upper ends of the lights, keeping them close down on nights; also moderate waterings, which however should be applied very sparingly, till the roots begin to shoot, when repeat them moderately as occasion may require, taking care when the shoot begins to advance to admit fresh air more freely, in proportion, to strengthen the stems, according as they advance in height; and when they have risen near the glasses, it is proper to deepen the frame, either by the addition of another at top, or by raising it at bottom six or eight inches, in order to give the stems sufficient room to shoot to their full stature, repeating this once or twice, as the growth of the plants renders it necessary, still assisting them with plenty of water, and a large portion of fresh air daily, either by raising one end of the lights as above; or when the plants are advanced some tolerable height, and in the warm season, the lights may be taken away entirely, occasionally, in fine mild days, which will strengthen and inure them gradually to the full air: but always draw on the lights again towards the evening, or at the approach of a sharp air, cold blasts, or heavy rains; but as the summer approaches begin to expose them fully, only giving occasional shelter in cold nights or very wet weather, either by the glasses, or mats supported on hoop arches, till they begin to flower, which will be about the middle or latter end of June, or beginning of July; when the plants in their pots may be removed where wanted; either to adorn any of the garden compartments, or any apartment of the house, a tall straight stake being placed to each plant, to fasten the stem to for support.

The plants must still be duly supplied with water all the time of their bloom, as every other day, or oftener, in very hot dry weather.

Sometimes roots when planted in May in the full ground, will shoot tolerably strong, and produce flowers in autumn.

They are all highly ornamental, but especially the single and double sorts, among other tender potted plants. The dwarf and variegated sorts also afford a fine variety.

POLYANTHUS. See PRIMULA.

POLYANTHUS-NARCISSUS. See NARCISSUS.

POLYGALA, a genus containing plants of the woody, under shrubby, and herbaceous perennial kinds.

It belongs to the class and order *Diadelphia Octandria*, and ranks in the natural order of *Lomentaceæ*.

The characters are: that the calyx is a five-leaved, small perianth: leaflets ovate, acute: two below the corolla, one above that, and two in the middle, subovate, flat, very large, coloured, (the wings) permanent: the corolla subpapilionaceous: standard almost cylindrical, tubular, short, with a small reflex mouth, bifid: wings; keel concave, compressed, ventricose towards the tip: appendix of the keel, in most of the species two three-parted pencil-shaped bodies, fastened to the keel towards the tip: the stamina have diadelphous filaments (eight connected) inclosed within the keel: anthers eight, simple: the pistillum is an oblong germ: style simple, erect: stigma terminating, thickish, bifid: the pericarpium is an obcordate capsule, compressed with an acute margin, two-

celled, two-valved: partition contrary to the valves; opening at each margin: the seeds solitary, ovate (with a glandular umbilicus).

The species cultivated are: 1. *P. myrtifolia*, Myrtle-leaved Milk-wort; 2. *P. Chamæbuxus*, Box-leaved Milk-wort.

The first has a shrubby stem, covered with a smooth brown bark, rising four or five feet high, and sending out several spreading branches towards the top: the leaves about an inch long and a quarter of an inch broad, lucid green, and sessile. The flowers are produced at the ends of the branches; they are large, white on the outside, but of a bright purple within: wings expanded wide, and standard incurved. It continues flowering most part of the summer: each cell of the seed-vessel contains one hard smooth shining seed. It grows naturally at the Cape of Good Hope.

The second species rises with a slender, branching, woody stalk, about a foot high, when it grows upon good ground, but on a rocky soil it is seldom more than half that height. The branches are closely garnished with stiff smooth leaves, of a lucid green: from between the leaves, towards the top of the branches, the flowers come out upon very short peduncles; they are white on the outside, but within are of a purplish colour mixed with yellow, and have a grateful odour. According to Martyn, it is an elegant little evergreen shrub, of low growth, with leaves like those of Box, producing flowers from May to October, but most plentifully in May and June: each flower stands on a peduncle, proceeding from a kind of triphyllous cup, formed of floral leaves. It is a native of Austria, &c.

Culture.—The first sort may be increased by seeds, which should be sown in small pots, filled with light loamy earth; soon after they are ripe, placing them where they may have the morning sun only till October, when they should be placed under a hot-bed frame, and be plunged into old tanners bark which has lost its heat, where they may be defended from frost during the winter, and in the spring the pots should be plunged into a moderate hot-bed, which will bring up the plants. When these appear, they should not be too tenderly treated, but have a large share of free air admitted to them; when they are fit to transplant, they should be carefully shaken out of the pots, and separated, planting each into a small pot filled with soft loamy earth, and plunged into a very moderate hot-bed, to forward their taking new root, shading them from the sun, and gently refreshing them with water as they may require. When they are rooted, they must be gradually inured to the open air, and in June they may be placed abroad in a sheltered situation, where they may remain till the middle or latter end of October, according as the season proves favourable; then they must be removed into the green-house; and treated in the same way as the Orange-tree, being careful not to give them too much wet during the winter season.

The second sort was formerly thought difficult to raise by seeds; but at present it is readily increased by parting its creeping roots, and planting them in bog earth, on a shady border, where it thrives very well, and spawns much.

The first affords variety when set out among other potted plants of the green-house kind; and the latter, in the borders, &c.

POLYGONUM, a genus containing a plant of the herbaceous annual kind.

It belongs to the class and order *Octandria Trigynia*, and ranks in the natural order of *Holoraceæ*.

The characters are: that the calyx is a turbinate perianth, coloured internally, five-parted; segments ovate, blunt, permanent: there is no corolla, unless the calyx be taken for it: the stamina have commonly eight filaments, awl-shaped, very short: anthers roundish, incumbent: the pistillum is a three-sided germ: styles commonly three, filiform, very short: stigmas simple: there is no pericarpium: calyx involving the seed: the seed single, three-sided, acute.

The species cultivated is *P. orientale*, Oriental Persicaria.

It has a root composed of many strong fibres, growing in tufts: the stem is jointed, eight or ten feet high, the lower part becomes woody, and as thick as an ordinary walking-cane, of a fine green, and a little hairy: the leaves are alternate, often a foot long, and six inches broad in the middle, terminating in acute points; they have one strong midrib, and several transverse veins, which run upwards towards the point; their surfaces are a little hairy, the upper of a bright green, and the under paler: the petioles are broad, half embracing at their base: the flowers in close terminating spikes, seven or eight inches long, hanging downwards: the stamens five, six or seven. The stipules are deserving of notice, being unusual in their form, and making the stem look as if ruffled. Thunberg remarks that the margin of the stipules is entire and revolute. It is a native of the East Indies, flowering from July to October.

There is a dwarf variety, and another with white flowers.

Culture.—This plant is constantly raised from seeds, and is said to rise from scattered seeds better than when sown: but where they are sown, it should be in autumn, soon after they

are ripe, as when sown in the spring they rarely succeed; or if some plants come up, they seldom grow so strong. They may be removed in the spring into the borders of the plantation or flower-garden, giving them room. They are, however, commonly sown in the spring with other annuals; thinning the seedlings, when they appear, so as to stand a foot apart. About the beginning of July the side shoots should be pruned off, to make them advance in height, and preserve them within compass; and when they are pruned up to five or six feet, they may be permitted to shoot out side branches. It delights in a rich moist soil. The plants are sometimes sown on hot-beds, in March, in order to be more forward.

These plants are distinguished for their superior stature and the brilliancy of their flowers: they frequently grow to the height of eight or ten feet, and rival the sun-flower.

POMEGRANATE. See PUNICA.

POMPION. See CUCURBITA.

POMUM. See PYRUS.

POPPY. See PAPAVER.

POPPY, HORNED. See CHELIDONIUM.

POPPY, PRICKLY. See ARGEMONE.

POPULUS, a genus containing plants of the hardy deciduous tree kind.

It belongs to the class and order *Dioecia Octandria*, and ranks in the natural order of *Amentaceæ*.

The characters are: that in the male—the calyx is an oblong ament, loosely imbricate, cylindrical, composed of one-flowered, oblong, flat scales, torn at the edge: the corolla has no petals: the nectary one-leafed, turbinate below, tubular, ending at top obliquely in an ovate border: the stamina have eight, extremely short filaments: anthers four-cornered, large: female—the calyx and scales as in the male: the corolla has no petals: nectary as in the male: the pistillum is an ovate-acuminate germ: style scarcely manifest: stigma four-cleft: the pericarpium is an ovate capsule, two-celled, two-valved: valves reflex: the seeds numerous, ovate, flying with a capillary pappus.

The species cultivated are: 1. *P. alba*, White Poplar; 2. *P. tremula*, Trembling Poplar Tree, or Asp; 3. *P. nigra*, Black Poplar Tree; 4. *P. dilatata*, Lombardy or Po Poplar Tree; 5. *P. balsamifera*, Common Tacamahaca Poplar Tree; 6. *P. candicans*, Heart-leaved Tacamahaca Poplar Tree; 7. *P. lævigata*, Smooth Poplar Tree; 8. *P. monilifera*, Canadian Poplar Tree; 9. *P. Græca*, Athenian Poplar Tree; 10. *P. heterophylla*, Various-leaved Poplar Tree; 11. *P. angulata*, Carolina Poplar Tree.

The first grows very tall, with a straight trunk, covered with a smooth whitish bark: the leaves are smooth, blackish green above, but having a thick white cotton underneath; they are about three inches long, on petioles an inch in length, flatted and grooved on each side: in young trees the leaves are roundish, but in adult ones angular, divided into three, five or seven lobes; they are without glands, either at the base or on the serratures. The flowers are exactly similar to those of the second sort. It is a native of Europe, from Sweden to Italy; also of Siberia and Barbary.

There are two varieties; the Common White Poplar, and the Great White Poplar, or Abele. In the first, the leaves are rounder, and not much above half the size of those of the latter; and the shoots of the latter are paler, the catkins are larger, and the down of the seeds whiter and longer.

In the latter the leaves are large, and divided into three, four, or five lobes, which are indented on their edges; they are of a very dark colour on their upper side, and very white and downy on their under, standing upon footstalks, which are about an inch long: the young branches have a purple bark, and are covered with a white down, but the bark of the stem and older branches is gray. In the beginning of April the male flowers or catkins appear, which are cylindrical, scaly, and three inches long, and about a week after come out the female flowers on catkins, which have no stamina like those of the male. Soon after these come out, the male catkins fall off, and in five or six weeks after, the female flowers will have ripe seeds inclosed in a hairy covering, when the catkins will drop, and the seeds be wafted by the winds to a great distance. According to Mortimer, the best sort comes from Holland and Flanders. Hence in some places it is called Dutch Beech.

The second species has a green smooth bark. The leaves at first breaking out are hairy above and cottony underneath, but when full grown are smooth; they are slightly heart-shaped, smaller and more approaching to circular than in the preceding, with a few angular teeth on the edges. According to Linnæus they are rolled inwards at the edge, and have two glands running one into the other on the inner side above the base. He also observes, that the leaf-stalks are flatted towards the end, whence the perpetual trembling of the leaves with every breath of wind: but the petioles being flat in the White and Black Poplars, as well as in this, Dr. Stokes accounts better for the phænomenon, from the plane of the long leaf-stalks being at right angles to that of the leaves, which allows them a

much freer motion than could have taken place had their planes been parallel. This trembling of the leaves has been so generally noticed as to have become proverbial. This tree is of speedy growth, and will grow in any situation or soil, but worst in clay. It impoverishes the land: its leaves destroy the grass, and the numerous shoots of the roots spread so near the surface, that they will not permit any thing else to grow. The wood is extremely light, white, smooth, woolly, soft, durable in the air. Pannels or pack-saddles, canns, milk-pails, clogs, pattens, &c., are made of the wood. It is a native of Europe, from Sweden to Italy.

The third has a naked lofty trunk, covered with an ash-coloured bark, and a regular handsome head: the leaves are slightly notched on their edges, smooth on both sides, and of a light green colour. They have no glands at the base, but the serratures are glandular on the inner side: the petioles are yellowish. It is a tree of quick growth, and on the banks of rivers and in moist situations it grows up to a great height, throwing out numberless suckers from the roots. It loves a moist black soil, and bears cropping well: the bark, being light like cork, serves to support the nets of fishermen. The wood is not apt to splinter: it is light and soft, and sometimes used by turners. It is incomparable, according to Evelyn, for all sorts of white wooden vessels, as trays, bowls, and other turner's ware; and is of especial use for the bellows-maker, because it is almost of the nature of cork, and for ship-pumps, though not very solid, yet very close and light. It affords useful rafters, poles, and rails, and in a proper soil makes a very quick return for such purposes. It is excellent for flooring-boards, and is much used for the purposes of deal in some midland counties. It is a native of Europe, from Sweden to Italy.

The fourth species differs from the third sort chiefly in its close conical manner of growth, like the Cypress. The leaves are greater in breadth than length, whereas in that the longitudinal diameter is the greatest.

This has been esteemed by some as no more than a variety of that; and indeed it can scarcely be considered as a distinct species. It has been stated in Mr. Young's Annals, that the Italian Poplar is fit to cut for building uses in twelve years, and that at eight years growth they are forty feet high. For rafters, small beams, studs, boards, &c. it is very durable.

The peculiar use of it in this country has hitherto been for ornamental plantations, and covering unsightly buildings. To the latter purpose its upright close conical mode of growing, with its feathering very readily down to the very ground, particularly adapts it. The conic form of it, as a deciduous tree, is peculiar. Among evergreens we find the same character in the Cypress; and both trees in many situations have a good effect. One beauty the Italian Poplar possesses which is almost peculiar to it; and that is the waving line it forms when agitated by wind. Most trees in this circumstance are partially agitated; one side is at rest, while the other is in motion; but the Italian Poplar waves in one simple sweep from the top to the bottom, like an ostrich-feather on a lady's head. All the branches coincide in the motion; and the least blast makes an impression upon it, when other trees are at rest. Although this tree sometimes has a good effect, when standing single, it generally has a better when two or three are planted in a clump.

In the fifth, the growth seems not to be to a very large size: the bark is smooth, like that of the third sort; the young branches have much the same appearance, but their annual shoots are seldom more than a foot in length. The leaves resemble those of the Pear-tree; are about four inches long, and an inch and half broad in the middle, drawing towards a point at each end; their upper side is of a deep green, and their under side is hoary; they stand upon long foot-stalks, and are placed without order upon the branches. The male flowers come out from the side of the branches in long catkins, in April and May, and fall off soon after; their stamens are numerous, irregular in height, and crowned with headed anthers of a purple colour. The hermaphrodite flowers ate produced at the end of the shoots upon long slender peduncles, in very loose catkins, having a leafy involucre under each, which is oval and entire; and from the bosom of that arises the peduncle, which is very short. Upon the top is placed the petal or calyx, (or nectary, according to Linnæus) shaped like a wide cup, having a large style in the centre, and two stamens on one side, terminated by pyramidal purple anthers. These flowers appear in July, and are succeeded by oval capsules terminating in a point, and inclosing downy seeds. The scaly covers of the buds abound with a tenacious balsam in the spring, becoming liquid by heat. It is of a yellowish colour and a fragrant scent. It is a native of Canada and some other parts of North America.

There are varieties, with much wider leaves; the Daurian, with a longer ovate leaf, more like this sort; and an Altaic variety, with a lanceolate leaf.

In Siberia the trunk is straightish, not tall, covered with an ash-coloured bark; the wood reddish, closer, and a little harder than in the

common Poplars. The branchlets in the Altaic tree are more slender, and rod-like; in the Daurian thick, short, knobbed, and wrinkled, with a yellow skin sometimes of a very deep colour: the leaves in the rod-like variety ovate-acuminate, in the Altaic commonly lanceolate; in the common Daurian ovate and thicker, so as to be in a manner coriaceous; in both very sharp, serrate, quite smooth, shining as if varnished, deep green above, pale underneath: aments terminating, thick, the female ones ripening in June; containing ovate thick rugged capsules, subcalycled with the receptacle, scarcely peduncled.

The sixth species is resinous, like the preceding; but the leaves are different, being hollowed next the petiole and drawn out at the point. It flowers earlier, as in March. It is a native of Canada.

The seventh is a native of North America, flowering in March and April.

The eighth species is a native of Canada, flowering in May.

The ninth resembles the tenth species in growth and foliage. It is a native of the islands of the Archipelago, flowering in March and April.

The tenth species is a large tree, having numerous branches, veined and angular; the leaves broad and slightly serrate: flowers in loose aments, making little show. It is a native of Virginia and New York, flowering in April and May.

The eleventh shoots very strong, and is generally cornered, covered with a light green bark like some sorts of willow. The leaves upon young trees, and also upon the lower shoots, are very large; but those upon older trees are smaller: as the trees advance their bark becomes of a lighter colour, approaching to gray: the aments are like those of the third sort; and the anthers are purple. It grows naturally in Carolina, where it becomes a very large tree, and flowers in March.

Culture.—All the sorts are readily increased by cuttings, layers, and suckers.

The planting of the cuttings is the most expeditious mode of raising all these trees, as they grow freely without any trouble, when made either from the young year-old shoots, a foot and a half in length, and planted a foot in depth, or large truncheons of two, three, or more years growth, from about a yard to five or six feet long, planted in moist places: though these large cuttings or truncheons are not proper for general plantations, only in some particular parts, as in a marshy or watery situation, where shade and shelter, &c., may be required as soon as possible, in which they may be planted finally to remain, putting them in to the depth of one or two feet.

In order to raise plants for regular plantations, or for handsome standards, it is the best method to raise them principally from young cuttings of one year's growth, or two at most. These young cuttings should be made about fifteen or eighteen inches long, and planted out in nursery-rows two feet asunder, placing each cutting two parts or half-way in the ground, and about a foot distant in the lines, they readily take root, and make good shoots the following summer, care being taken to trim off the straggling laterals in order to encourage the leading shoot to grow straight, and rise more expeditiously in height: after having had from two to four or five years growth in this situation, they may be finally removed for the purposes for which they are wanted.

The layers may be laid down in autumn, choosing the lower young shoots, which are conveniently situated, laying them by slit-laying. They will be well rooted, and fit to remove by the autumn following, in nursery-rows, to have two or three years growth.

The suckers, which some of the sorts send up in abundance from the roots, as the fifth sort, may be taken up after the fall of the leaf, and be planted in nursery-rows, as directed for the cuttings. They form good plants in two years.

The plants raised in any of the above methods, after having obtained from two or three to five or six years growth, are of a proper size for furnishing plantations, or other places.

These trees are also capable of being raised from seed, if care be taken to gather a quantity as soon as ripe; and sow them in autumn, in beds either broad-cast or in drills, half an inch in depth.

These trees may be employed in assemblage for ornament in out-grounds, which are detached from fine lawns and walks, as on account of the great litter the falling of their catkins in some sorts occasions, they are improper, but are excellent for planting towards the boundaries of parks, paddocks, and fields, the sides of rivers and brooks, and to intersperse with other trees in large plantations, in any interior parts. The White Poplar, the Carolina, Tacamahaca, Lombardy and Athenian Poplars, are proper to introduce as ornamental trees, and are finely adapted to be employed in assemblage in forming large avenues, open groves, and clumps in parks, &c., though any of the sorts are eligible on the same occasions to increase the variety; and all the sorts may be employed

to advantage in any large tracts of plantation. To marshy grounds no trees are better adapted than Poplars, especially the first three species, all of which thrive remarkably in moist situations.

As forest or timber trees, the White, Black, Tremulous, and Lombardy Poplars are proper to be employed.

Marshy lands may be improved to much advantage by coppices of these trees, to cut every four, five, or six years for poles, and other small purposes; being planted in rows a yard asunder, and in seven years they will be fit to cut for many small uses, and the stools shooting up again strong, afford a cutting every four or five years afterwards.

Some sorts may also be planted occasionally to form hedges in moist or other situations, more particularly the Lombardy Poplar, as this sort is peculiar in branching out numerously from the bottom upwards, and may be planted hedge-fashion along the sides, or top of outward watery ditches, in large plants, so as at once to form a hedge; they being topped to five, six, or seven feet.

PORRUM. See ALLIUM.

PORTLANDIA, a genus containing plants of the trailing evergreen exotic kinds, for the stove.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Rubiaceæ*.

The characters are: that the calyx is a five-leaved perianth, superior: leaflets oblong-lanceolate, permanent: the corolla one-petalled: tube long, funnel-form-ventricose: border shorter than the tube, five-parted, acute: the stamina have five awl-shaped filaments, declined, almost the length of the corolla, from the bottom of the tube: anthers linear, erect, the length of the corolla: the pistillum is a five-cornered germ, roundish, inferior: style simple, the length of the stamens: stigma oblong, obtuse: the pericarpium is an obovate capsule, five-streaked, five-cornered, retuse, two-celled, two-valved; opening at the top; partition contrary: seeds very many, roundish, compressed, imbricate.

The species cultivated is *P. grandiflora*, Great-flowered Portlandia.

It has a shrubby, upright stem, branched, knotty, with a smooth bark cracking longitudinally: the branches opposite, spreading, round, scarcely divided, leafy, covered with smooth green bark: the buds are gummy: the leaves opposite, spreading, somewhat lengthened at the point, equal at the base, entire, very smooth, paler beneath, marked with alternate veins projecting on both sides: the footstalks are very short, thick, round below but flattish above: the stipules between the leaves, connate, triangular, pointed, very smooth, pale, closely pressed to the branch: the flowers axillary, mostly solitary, between the stipules, peduncled, a little nodding, very large, white, beautiful, most fragrant at night, in the bud yellowish tipped with red. It was found in the West Indies, flowering in July and August.

Culture.—These plants may be raised either from seeds or cuttings.

The seeds when procured should be sown in pots, filled with light earth, in the spring, plunging them in the tan-bed, in the stove. When the plants are sufficiently strong, they should be removed into separate pots, and be replunged in the bark hot-bed, where they must be constantly kept.

The cuttings of the young shoots should be planted out singly, in pots filled with the same sort of mould, plunging them in the bark-bed of the stove; when they have taken good root they should be removed into larger pots, replunging them into the tan-bed, where they must remain.

They afford a fine effect, when trained on the back part of the stove, in their larger flowers.

PORTULACA, a genus containing plants of the herbaceous and shrubby kinds.

It belongs to the class and order *Dodecandria Monogynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is a bifid perianth, small, compressed at the tip, permanent (two-leaved, superior, caducous): the corolla has five petals, flat, erect, blunt, larger than the calyx: the stamina have many filaments (to twenty), capillary, shorter by half than the corolla: anthers simple: the pistillum is a roundish germ (half inferior): style simple, short: stigmas five, oblong, the length of the style: the pericarpium is a covered capsule, ovate, one-celled (cut transversely): receptacle free (five, free, separate): the seeds numerous, small.

The species cultivated are: 1. *P. oleracea*, Garden Purslane; 2. *P. Anacampseros*, Round-leaved Purslane.

The first is an annual herbaceous plant, with a round, smooth, procumbent, succulent stem, frequently red, and diffused branches, often throwing out fibres at the joints: the leaves more or less wedge-shaped, oblong, blunt, fleshy, smooth, quite entire, sessile, clustered, especially at the ends of the branches: the flowers are sessile, scattered: corollas yellow, spreading; petals subtruncate at the tip and emarginate: the stamens ten: the capsule one-

celled, opening horizontally: the seeds round, black, very small. It is a native of both Indies, China, Cochinchina, and Japan. It was formerly much in request as a wholesome salad and pickle, but at present is little in use.

There are several varieties. The garden Purslane differs from the wild, only in having larger and more succulent leaves. If it be permitted to scatter the seeds, in two years it will become in every respect like the wild plant. Of the two other varieties, one is with deep-green leaves, and the other with yellow leaves, which is called Golden Purslane.

The second species has a shrubby stalk, four or five inches high: the leaves are thick and succulent. At the top of the stalk comes forth a slender peduncle about two inches long, supporting four or five red flowers, appearing in July, but not succeeded by seeds in England. It is a native of the Cape of Good Hope.

Culture.—These plants may be increased by seeds and cuttings, according to the different kinds.

In the first sort, the seeds should be sown in slight drills, or broad-cast over the surface, at different times, in the spring and summer, from March to June, or later, at the distance of three weeks, the early sowing being made on slight hot-beds, but the late ones in the open borders, where the ground is light and dry, occasional light waterings being given afterwards, both before and after the plants appear, which must remain where they come up, and are mostly fit for cutting in the course of a month or five weeks. In gathering them, the young tops should be cut off with a knife, and they afterwards shoot out fresh tops.

In the second sort the cuttings should be planted in pots filled with light dry mould, and plunged in the tan-bed, in order to promote their rooting, moderate shade and waterings being given till they have stricken good root, being kept in the stove, and afterwards managed as the succulent kinds of aloes.

The last affords variety among other stove potted plants.

PORTULACARIA, a genus furnishing a shrubby plant of the succulent green-house kind.

It belongs to the class and order *Pentandria Trigynia.*

The characters are: that the calyx is a two-leaved perianth, coloured, permanent: leaflets roundish, concave, obtuse, spreading very much, opposite: the corolla has five obovate petals, obtuse, quite entire, concave at top, flat at the base with the sides mutually incumbent, spreading very much, almost three times as long as the calyx, permanent: the stamina have five awl-shaped filaments, very short, erect, two on each side of the germ, the other solitary: anthers erect, ovate: the pistillum is a three-cornered germ, superior, the length of the petals: style none: stigmas three, spreading very much, ascending at the tip, muricated above: there is no pericarpium: the calyx and corolla, now erect, closely embrace the base of the seed: the seeds single, ovate-oblong, obtuse, winged-three-sided.

The species is *P. Afra,* African Purslane Tree.

It rises with a strong thick succulent stalk to the height of three feet, sending out branches on every side, so as to form a kind of pyramid, the lower branches being extended to a great length, and the others diminishing gradually to the top; they are of a red or purplish colour and very succulent. The leaves are also succulent and roundish, very like those of Purslane, whence the gardeners call it the Purslane Tree. It is a native of Africa. It is not known that it has yet flowered in this climate.

Culture.—It is readily increased by cuttings of the stems or branches, planted during any of the summer months, having been laid to dry for some days before, in pots filled with sandy earth, being placed in a frame, and shaded in hot weather, and protected from wet. They are also much forwarded by being plunged in the bark-bed of the stove. It must be placed in a warm glass case in winter, where it may enjoy the full sun, and should have very little water during that season. In summer the plants should be placed abroad in a sheltered situation, and in warm weather be refreshed with water twice a week; but the stalks being very succulent, too much wet is always hurtful.

These afford variety among other green-house plants.

POTATOES. See Solanum.

POTATOES, CANADA. See Helianthus Tuberosus.

POTENTILLA, a genus containing plants of the herbaceous and shrubby kinds.

It belongs to the class and order *Icosandria Polygynia,* and ranks in the natural order of *Senticosæ.*

The characters are: that the calyx is a one-leafed, flattish, ten-cleft perianth: the alternate segments smaller reflex: the corolla has five roundish petals, spreading, inserted by their claws into the calyx: the stamina have twenty filaments, awl-shaped, shorter than the corolla, inserted into the calyx: anthers elongate-lunulate: the pistillum has numerous germs, very small, collected into a head: styles filiform, the length of the stamens, inserted into the side of

the germ: stigmas obtuse: there is no pericarpium: common receptacle of the seeds roundish, juiceless, very small, permanent, covered with seeds, inclosed within the calyx: the seeds numerous, acuminate-wrinkled.

The species chiefly cultivated are: 1. *P. fruticosa*, Shrubby Cinquefoil; 2. *P. fragarioides*, Strawberry-leaved Cinquefoil; 3. *P. recta*, Upright Cinquefoil; 4. *P. Monspeliensis*, Montpelier Cinquefoil; 5. *P. grandiflora*, Great-flowered Cinquefoil.

Other species may be cultivated for variety.

In the first, the whole plant is set with fine silvery hairs: the stems erect, clothed with a brown bark which cracks longitudinally, branching very much, about three feet (or in gardens four feet) high, frequently reddish: the leaves alternate, covering the branches, petioled, quinate-pinnate, or consisting of five rarely seven oblong leaflets, somewhat rolled back, quite entire, hairy underneath; the upper ones ternate. Dr. Withering remarks, however, that the leaves can hardly be called pinnate, consisting of two pairs set cross-wise, rising from the same point, with a terminating one divided down to the base into three open segments; and that the leaflets are linear-lanceolate, turned back at the edges, dark green above, pale underneath. Flowers terminating, solitary, peduncled, of a bright yellow or golden colour, and very ornamental. It is a native of Oeland, England, Siberia, and China, flowering here in June and July.

It has a beautiful appearance, in its numerous flowers.

The second species has the root somewhat tuberous: the leaves silky on hairy petioles, with three, five, or seven leaflets, which are ovate, opposite, serrate, lessening as they approach the base: the runners are decumbent. It is a native of Siberia.

The third has a stem about a foot high, rigid, covered with a pile rather than hairs, reddish, at top corymbed, or dividing into several peduncles forming a sort of umbel: the leaves are large, having each five or seven oblong villose leaflets, frequently of a russet colour, with ten or twelve blunt teeth; when old almost naked: the lower ones are petioled, the upper ones sessile, finally becoming linear and stipular. The flowers are abundant on the top of the stem, erect on solitary peduncles, altogether making the stem panicled. It is a native of Germany and the South of Europe, flowering in June and July.

The fourth species is a perennial plant: the stalks grow erect, about a foot high; they are very hairy: the leaflets oblong, serrate: the peduncles come out above the joints of the stalk: the flowers are white and large: they come out in June; and the seeds ripen in autumn. It is a native of the South of France.

The fifth has also a perennial root: the stems trailing: the leaflets ovate, obtuse, bluntly indented on their edges: the flowers larger than in the fourth sort, and the whole plant of a deeper green. It flowers in July, and the seeds ripen in autumn. It is a native of Switzerland and Siberia.

Culture.—The first sort may be readily increased by suckers, layers, and cuttings, which may be laid down or planted out in the autumn or spring season, and be removed into the nursery in the spring following; and after having two or three years growth in that situation, they will be fit for planting out in the clumps and shrubbery borders.

When removed from their natural situations into these places, the best season is in the autumn, before the frosts begin, that they may get well rooted. They should be watered occasionally in dry weather.

They succeed best in a cool moist soil and shady situation.

All the other kinds may be increased by parting the roots, and planting them out in the autumn, or by sowing the seeds either in the autumn or spring seasons.

They all afford ornament and variety in the different parts of pleasure-grounds.

POTERIUM, a genus containing plants of the herbaceous and shrubby perennial kinds.

It belongs to the class and order *Monoecia Polyandria*, and ranks in the natural order of *Miscellaneæ*.

The characters are: that the calyx is a four-leaved perianth: leaflets ovate, coloured, caducous: the corolla four-parted: segments ovate, concave, spreading, permanent: the stamina have very many filaments, (thirty to fifty) capillary, very long, flaccid: anthers roundish, twin.—Female flowers in the same spike above the males: the calyx a perianth as in the male: the corolla one-petalled, wheel-shaped: tube short, roundish, converging at the mouth: border five-parted: segments ovate, flat, reflex, permanent: the pistillum has two, ovate-oblong germs, within the tube of the corolla: styles two, capillary, coloured, flaccid, the length of the corolla: stigmas pencil-form, coloured: the pericarpium is a berry formed of the tube of the corolla, hardened, thickened, closed: the seeds two: inverted.

The species are: 1. *P. Sanguisorba*, Lesser Upland or Common Garden Burnet; 2. *P. hybridum*, Sweet Burnet; 3. *P. spinosum*, Prickly Shrubby Burnet.

The first has a perennial root, penetrating deep into the earth: the stems nearly upright, from nine inches to a foot high, and a foot and half in cultivation; branched, striated, reddish, smooth except at bottom, where they are slightly hairy: the leaves unequally pinnate, on pretty long peduncles, next the root collected into a tuft, on the stem alternate: the leaflets smooth, pale or blueish underneath, deeply serrate about the edge, the lower ones on the same leaf commonly alternate, and the upper ones opposite: the bottom leaves have seven or eight pairs of roundish leaflets; the stem-leaves have five or six, or at top only two pairs of ovate pointed leaflets: the petiole is three-cornered, channelled, hairy, and somewhat membranaceous at the base. Stipules toothed: the flowers are peduncled in little roundish heads; greenish, sometimes purplish on the outside, the terminating one largest; each head has male flowers below, and female or fertile flowers above, expanding before the former, which are frequently imperfect hermaphrodites. It is a native of England, Germany, Switzerland, &c., flowering in May, and sometimes in April.

It is frequently cultivated for winter and spring salads, and for cool tankards.

The leaves and seeds are mildly astringent, and have been used in dysenteries and hæmorrhages.

The second species is a biennial plant, decaying soon after the seeds are ripe: the leaves are composed of three or four pairs of oblong leaflets, placed a little alternate; they are deeply indented, and have an agreeable scent: the stems two feet high, with one of these leaves at each joint, gradually diminishing in size to the top; and just above the leaf arises a long peduncle, which supports two or three small ones, each sustaining a small roundish spike of flowers. These appear in July, and are succeeded by seeds which ripen in autumn. It is a native of the South of France, Italy, and Barbary.

The third has a shrubby stalk, rising about three feet high, and dividing into several slender branches, armed with sharp branching thorns: the leaves are very small, unequally pinnate, with six or seven pairs of opposite leaflets, of a lucid green, and continuing all the year: the flowers of an herbaceous colour, in small heads at the ends of the branches: they appear the beginning of June, and there is a succession of them most part of the summer; but those only which come early, are sometimes succeeded by seeds in England. It is a native of the Levant.

Culture.—The first sort may be readily increased by seeds and parting the roots.

The seeds should be sown in the autumn, on a bed or border of light mould, when they are perfectly ripened. When the plants have attained two or three inches in height, they should be planted out on a bed, at the distance of a foot, when for salads, or in the borders where they are to remain.

The roots may likewise be parted in the autumn, and planted where they are to remain, in the same manner as the above.

The second sort may be increased in the same way.

And the last sort may be raised from slips or cuttings, which should be planted in a bed of light earth during the summer season, and covered with glasses or in pots, and placed under a frame and glasses, giving shade and water occasionally.

They may also be had more forward by plunging the pots in a moderate hot-bed under glasses. They should be removed into separate pots when they have stricken good root and are well established. They should afterwards be protected from frosts in the winter, by being placed in a mild hot-bed, and have but little water in the winter season.

The first sorts are ornamental in the borders, clumps, and other parts, and the last among other potted greenhouse plants.

POT, GARDEN, such as are made use of for plants and flowers.

Pots of these kinds are particularly necessary in the culture of numerous sorts of plants, such as all tender exotics of the greenhouse and stove sorts, which must be planted in them for the convenience of moving them in and out of their departments as there may be occasion.

They are also exceedingly useful in raising many young seedlings and cuttings that require moving to occasional shade, shelter, and artificial heat; likewise for many young plants that are tender whilst young, and require to be removed under shelter for the first two or three winters, but become hardy enough afterwards to bear the full air the year round; and likewise to plant many of the more curious hardy flowering plants and others, and choice flowering shrubs, &c. in, to remove occasionally to adorn particular compartments or situations.

In general there are about eight different sizes of this sort of pots made use of, which are necessary in order to suit the different sorts of plants, as well as all sorts in their different stages of growth; as when the plants are young and of small size, they may be first planted in small ones, and as they increase in bulk be shifted into those a size larger, repeating it as often as necessary. See PLANTING in POTS and SHIFTING PLANTS.

The several sizes are in regular gradation, each size having its name for the convenience of readily supplying the sizes wanted for particular uses, being always reckoned by the cast at the houses, from two to sixty pots to each, according to their sizes, the largest having only two to a cast, and the smallest sixty; so that, being of eight different sizes or casts, they are distinguished by the following terms, twos, eights, twelves, sixteens, twenty-fours, thirty-twos, forty-eights, and sixties; the several casts from the twos being in a gradual diminution in size, and the price of the different casts is the same; those of two, &c., being as much as those of sixty, and so of the rest: from two to three shillings is the general price per cast at the potteries in the vicinity of London.

In garden pots there is also a particular shallow sort of a wide, squat, pan-form make, used on some occasions, especially among the myrtle-gardeners in the neighbourhood of London, in raising great quantities of these plants annually, in order to have always a regular succession advanced to proper growth, for the markets. These kinds of wide shallow pan-pots are employed to prick or plant out the requisite supplies of numerous small myrtle cuttings, in summer, &c., for annual propagation, and which are commonly called store-pans.

In these store-pans they generally prick a great number of such small slips or cuttings, at only about an inch or two apart, often to the amount of hundreds in each, just to strike them, and remain two or three months or more, till advanced a little in growth; in which time the pans thus stored are convenient for removing to different situations required, such as, at first planting or afterwards, either into a hot-bed, whereby to strike the cuttings more expeditiously, or for the same advantage, when in want of hot-beds, to be placed under a garden-frame and lights, or under hand-glasses, either with or without a hot-bed; and also for removing to a green-house or garden-frame, for protection in winter, &c., all of which being thus continued in them, according to the progress of growth which they make; so that, when they discover themselves to be well struck in bottom radicles and have shot a little top, they may be pricked out separately into small pots, or occasionally three, four, or five in larger ones, for a year, then separated as above, or sometimes bedded out in the spring in beds of natural earth, six or eight inches apart, to acquire an advanced state of growth till autumn, and then potted off singly.

The same kind of pan-pots are also useful for several other purposes of propagation, both to sow seeds and plant small cuttings, slips, &c. in, of tender exotics, and of various other sorts of curious or particular kinds of plants, both of the green-house, hot-house, and the open ground, in order to have similar culture as the above. These pan-pots are from ten to twelve, or fourteen inches in width, and about six inches deep, having holes at bottom as in the common kind. And another sort of pot of different make from the general kind is sometimes used for planting some kinds of bulbous roots in, for blowing in the apartments of the house: they are narrow and upright, of equal width from bottom to top, six, eight, or ten inches deep, or a little more, and from three to four or five inches in width; and are occasionally used for planting bulbs of the Guernsey lily and some other similar kinds, to blow in autumn and winter, in the windows or on the chimney-piece of the dwelling or sitting-room, or in a green-house, or hot-house, &c., as they appear neat, and admit of being placed close, or in a smaller space than the common pots, one bulb being planted in each; they being previously filled with light sandy earth to near the top. See PLANTING in POTS.

All these several sorts of pots may be obtained at the potteries in the different parts of the kingdom.

In choosing the pots it is necessary to see that they are burnt sufficiently hard, and so perfectly sound as to ring when struck with your knuckles, and that they have all holes at the bottom to discharge the superfluous moisture from the earth about the roots of the plants, the larger sorts having generally four holes, one in the middle of the bottom, and three around the circumference, at equal distances; but the smaller kinds commonly only one in the middle of the bottom.

In respect to the sizes of pots that are proper for the different sorts of plants, it is commonly mentioned in the culture of the plants where any particular sizes are necessary.

Where small pots are advised, it is generally to be understood either as sixties, forty-eights, or thirty-twos, according to the sorts or sizes of the plants that are to be potted.

POTTING OF PLANTS. The operation of placing or planting different sorts of plants, roots, and cuttings, &c., in pots. In this business more care and attention is necessary than is generally bestowed.

POT-HERBS, such as are used for different culinary purposes, consisting of different sorts of the small aromatic kind, and some others. But in a more general signification they comprehend many of the other kitchen garden vege-

tables, but are principally understood to be such as are in request to improve soups, broths, and some other similar culinary preparations, in which, sometimes, several different kinds of small herbs are used in different proportions, both in composition, and singly.

They are chiefly the following sorts: thyme, marjoram, savory, sage, parsley, mint, penny-royal, sorrel, chervil, basil, coriander, dill, fennel, marigold, borage, burnet, tansey, tarragon, chives, leeks, onions, green-beet, white-beet, spinach, celery, endive, lettuce, love-apple, capsicum, and purslane.

Those made use of separately, as salad-herbs, are green and white spinach, to boil as separate dishes; celery, endive and lettuce, as choice salad herbs, and sometimes to stew. But of the above, the thyme, marjoram, savory, parsley, sage, mint, marigold, penny-royal, leeks, celery, and onions, are in the greatest request.

Proper supplies of the different sorts may be raised in the manner directed, under their particular heads. See AROMATIC and KITCHEN GARDEN PLANTS.

PRASIUM, a genus containing plants of the low shrubby exotic evergreen kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leafed perianthium, campanulate-turbinate, erect, bilabiate: upper lip wider, semitrifid, acute; lower lip a little smaller, two-parted: the corolla one-petalled, ringent: upper lip erect, ovate, obsoletely emarginate, concave: lower lip wider, trifid, reflex: the middle segment larger: the stamina have four awl-shaped filaments, pressed to the upper lip, spreading, shorter than the upper lip: two shorter than the two others: anthers oblong, lateral: the pistillum is a quadrifid germ: style filiform, length and situation of the stamens: stigma bifid, acute, with one segment shorter: the pericarpium consists of four berries, at the bottom of the calyx, roundish, one-celled: the seeds are solitary, roundish.

The species are: 1. *P. majus*, Great Spanish Hedge Nettle; 2. *P. minus*, Small Spanish Hedge Nettle.

The first rises with a shrubby stalk two feet high, covered with a whitish bark, and divides into many branches which are declining: the leaves are the size of those of baum, cordate, smooth, blunt, petioled. The flowers come out from the bosom of the leaves in whorls round the stalks: are white, and have large permanent calyxes, cut into five points. It is a native of Spain, &c., flowering here from June to August.

The second species has a shrubby stalk like the former, but rises a little higher: the bark is whiter, the leaves are shorter and ovate, and of a lucid green: the flowers are somewhat larger, and are frequently marked with a few purple spots. It is a native of Sicily.

Culture.—These plants may be increased by seeds and cuttings.

The seeds should be soon on a bed of light mould, in the early spring season, as about April, the plants being afterwards kept clear from weeds, and in the following autumn be removed and placed in the situations where they are to remain, or in pots to be gradually hardened as they advance in growth.

The cuttings should be taken from such plants as are strong, and where the shoots are short and good, and if a joint of the former year's wood be taken to each of them, they succeed better. They should be planted out either in a shady border or in pots in the latter part of the spring season, as about the end of April. When the plants have stricken good root in the borders, they should be removed into the situations where they are to remain, and those in pots into separate ones. These in pots should be placed under a frame during the winter, or in the green-house, where they can have plenty of free air when the season is dry. They only require to be screened from severe frosts. When planted in the open ground they should have a dry poor soil and sheltered situation. These plants afford much ornament in the green-house collections, and among other evergreen shrubs of the more hardy kinds.

PRICKLY PARSNEP. See ECHINOPHORA.

PRICKLY PEAR. See CACTUS.

PRIMROSE. See PRIMULA.

PRIMROSE NIGHTLY, or TREE. See OENOTHERA.

PRIMROSE PEERLESS. See NARCISSUS.

PRIMULA, a genus containing plants of the low fibrous-rooted herbaceous flowery perennial kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Preciæ*.

The characters are: that the calyx is a many-leaved involucre, many-flowered, very small: perianthium one-leafed, tubular, five-cornered, five-toothed, acute, erect, permanent: the corolla monopetalous: tube cylindrical, the length of the calyx, terminated by a small hemispherical neck: border spreading, half-five-cleft: segments obcordate, emarginate, obtuse: throat pervious: the stamina have five very short filaments, within the neck of the corolla: anthers acuminate, erect, converging, included: the

Painted by Syd. Edwards London Published June 1.1806 by G.Kearsley Fleet Street Engraved by T. Sanford

1 *Primula veris.* *Oxlip.*

2 *Paonia tenuifolia.* *Fine leaved Peony*

pistillum is a globular germ: style filiform, the length of the calyx: stigma globular: the pericarpium is a capsule cylindrical, almost the length of the perianth, covered, one-celled, opening with a ten-toothed top: the seeds numerous, roundish: receptacle ovate-oblong, free.

The species cultivated are: 1. *P. vulgaris*, Common Primrose; 2. *P. elatior*, Great Cowslip or Oxlip; 3. *P. officinalis*, Common Cowslip or Paigle; 4. *P. farinosa*, Bird's-eye Primrose; 5. *P. longifolia*, Long-leaved Bird's-eye Primrose; 6. *P. cortusoides*, Cortusa-leaved Primrose; 7. *P. marginata*, Silver-edged Primrose; 8. *P. Auricula*, Auricula or Bear's-ear.

The first has a perennial root, growing obliquely, appearing as if bit off at the end, beset with thick reddish scales which are the remains of past leaves, sending down numerous very long round whitish fibres; it has a singular smell, somewhat like that of anise: the leaves are obovate-oblong, about a hand's-breadth in length, nearly upright, tapering to the base, blunt, veiny, wrinkled, smooth above, hirsute beneath, rolled back at the edge when young, slightly waved, unequally notched, the midrib whitish, terminating in a footstalk of a reddish colour, channelled on one side and keeled on the other: the scapes or peduncles numerous, the length of the leaves, upright, round, hirsute, pale green, having awl-shaped bractes at the base, after the flowering is over bending back: the flowers upright, large, sweet-scented: the corolla is of a pale sulphur colour; each of the five clefts obcordate, and marked at the base with a spot of a much deeper yellow: the mouth has a faint rim round it. The flower of the wild Primrose is a pale brimstone colour; but in some places it is found of a purple hue.

The varieties are numerous, being partly wild and partly produced by cultivation. The principal of which are; the Common Yellow-flowered: the White: the Paper-white: the Red: the Double Yellow: the Double White: the Double Red: the Double Pink: the Double Crimson Primrose. It is a native of most parts of Europe, flowering in March and April with the Wood Anemone.

It is observed, that a fine flower of this sort should possess a graceful elegance of form, a richness of colouring, and a perfect symmetry of parts. The properties are mostly similar to those which distinguish the Auricula, in what relates to the stem or scape, the peduncles or flower-stalks, and the formation of the umbel, bunch or thyrse, vulgarly termed the *truss*: the tube of the corolla above the calyx should be short, well filled at the mouth with the anthers, and fluted termination rather above the eye: the eye should be round, of a bright clear yellow, and distinct from the ground colour: the ground colour is most admired when shaded with a light and dark rich crimson, resembling velvet, with one mark or stripe in the centre of each division of the border, bold and distinct from the edging down to the eye, where it should terminate in a fine point: the petals, technically termed the pips, should be large, quite flat, and perfectly circular, excepting the small indentures between each division, which separate it into five (sometimes six) heart-like segments; and the edging should resemble a bright gold lace, bold, clear and distinct, and so nearly of the same colour as the eye and stripes, as scarcely to be distinguished from it.

The second species has the leaves contracted towards the middle, almost as in the Cowslip: the scapes few, erect, longer than the leaves, many-flowered: the flowers umbelled, pedicelled, the outer ones generally nodding; like those of the Primrose in form and colour, but smaller. From which it is evidently distinguished by its many-flowered scape; as it is from the cowslip by the flat border of the corolla. It is found in the woods and other places in this Country, flowering in April and May.

Martyn remarks that if it be a variety, it is rather of the former than the latter. And Dr. Smith rather inclines to think that it is a hybrid production, or mule from a Primrose impregnated by a Cowslip.

It varies much in the colour of the flowers, but the chief are purple-flowered, red-flowered, gold-coloured, orange-coloured, with various shades of each.

The third has a root like that of the Primrose, but smelling more powerfully of anise: the leaves obovate-oblong, contracted suddenly towards the middle, or rather ovate with the petiole winged, shorter than those of the Primrose by nearly one half, fuller at the edge, which is somewhat folded as well as notched, stronger, of a deeper green, not running so taper at the base, covered on the under side with softer and shorter hair: the petioles smoother, whitish with scarcely any red in them: the scapes few, three or four times longer than the leaves, round, upright, pale, villose: the involucre at the base of the umbel, surrounding the peduncles, consisting of many, very small, concave, pale, acuminate leaflets: the flowers in an umbel, unequally pedicelled, hanging down, generally to one side, full yellow with an orange-coloured blotch at the base of each segment, contracted about the middle of the tube, where the stamens are inserted,

paler underneath, very fragrant. It is a native of Europe, flowering in April and May.

The varieties are the Common Single Yellow Cowslip: Double Yellow Cowslip: Scarlet Cowslip; and Hose, and Hose Cowslip.

The fragrant flowers of these plants make a pleasant wine, approaching in flavour to the muscadel wines of the South of France. It is commonly supposed to possess a somniferous quality.

The fourth species has a perennial root, somewhat præmorse, with numerous, long, perpendicular fibres, and sweet-scented: the leaves obovate-lanceolate, bright green, smooth and even, thickish, here and there turned back on the edges, underneath veined and powdered with white meal: the scape a hand's-breadth or span in height, far exceeding the leaves, round, upright, stiff and straight, of a pale green colour and mealy: the flowers sweet-scented, of a purple yellow colour, in an upright umbel, having at its base a many-leaved involucre, each leaflet of which is awl-shaped, and placed at the base of each peduncle. It is an elegant plant; is a native of many parts of Europe, flowering in July and August.

It varies in the size of the plant, having been found wild a foot and half in height, and in the cultivated plant a tendency to become viviparous, has been observed by Curtis, or to produce one or more tufts of leaves among the flowers of the umbel. In its wild state it seeds readily, and frequently when cultivated: the flowers also vary with different shades of purple, and have been found entirely white.

The fifth bears a great affinity to the fourth, but the leaves differ in form, colour, and mode of growth; when fully grown being twice the length of those of the other: they are not mealy, the under side being as green as the upper, and they have a greater tendency to grow upright: the scape is shorter and thicker: the flowers form a similar umbel, but each is smaller, and in point of colour much less brilliant. Upon the whole, though superior in size, it is inferior to that in beauty. It flowers early in May.

The sixth species, in the wrinkled appearance of its foliage, approaches the first sort; whilst in its inflorescence, the colour of its flowers, and solitary scape, which rises to an unusual height, it bears an affinity to the fourth. In the winter it loses the leaves entirely, and forms a sort of bulbous hybernacle under ground: this circumstance is necessary to be known, as it subjects the plant to be thrown away as dead. It flowers in June and July; and is a native of Siberia.

The seventh, in its farinaceous tendency, accords with the eighth sort, but is very unlike it in its wild state, the leaves being much narrower: the flowers larger, and of a different colour: the colour of the flowers approaches to that of lilac: it becomes mealy, particularly on the edges of the leaves, between the serratures, where it is so strong as to make the leaf appear with a white or silvery edge. It is a delicate pretty plant, with a pleasing musky smell, and flowers in March and April. It is probably a native of the Alps.

The eighth species has the leaves fleshy, succulent, with the edges mealy, serrated; or entire, according to some—deeply and equally toothed all round, as others affirm; while some say that the young leaves are entire: the adult ones serrate above the middle: the petioles leafy or winged: the leaflets of the involucre unequal, wide, lanceolate or blunt: the flowers very sweet, four or five, in an upright umbel: the calyx one-third of the length of the tube of the corolla, bell-shaped, toothed, mealy, as is also the scape: the tube of the corolla gradually widening upwards, not contracted at the neck: the border concave: the segments emarginate but not deeply, and not cut to the neck: the most common colours are yellow or red, but it is found also purple and variegated, with a white eye powdered with meal: capsule spherical or nearly so, flatted a little at top, of a coriaceous-cartilaginous substance, sprinkled with meal. It is a native of the mountains of Switzerland, Austria, &c., flowering in April and May.

It varies much in the leaves and flowers; as the oblong-leaved; roundish-leaved; broad-leaved; narrow-leaved; green-leaved; white- or meal-leaved; the purple-flowered, of various shades and variegations; red-flowered, with different shades and variegations; yellow-flowered, of different shades; double purple-flowered; double yellow-flowered; variegated purples, &c.

With regard to the properties of a fine auricula, they are these according to Martyn: "The stem should be strong, upright, and of such a height as that the umbel of flowers may be above the foliage of the plant: the peduncles or footstalks of the flowers should also be strong, and of a length proportional to the size and quantity of the flowers; which should not be less than seven in number, that the umbel may be regular and close: the tube, eye, and border should be well proportioned; which they will be, if the diameter of the first be one part, of the eye three, and the whole border six parts or thereabouts: the circumference of the border should be round or nearly so, or at least not what is called starry: the anthers ought to be large, bold, and fill the tube well; and the tube

should terminate rather above the eye, which should be very white, smooth and round, without cracks, and distinct from the ground-colour: the ground-colour should be bold and rich, and regular, whether it be in one uniform circle or in bright patches: it should be distinct at the eye, and only broken at the outer part into the edging: a fine black, purple, or bright coffee-colour contrast best with the white eye: a rich blue, or bright pink is pleasing, but a glowing scarlet or deep crimson would be most desirable, if well edged with a bright green; this, however, can seldom be expected: the green edge is the principal cause of the variegated appearance in this flower, and it should be in proportion to the ground-colour, that is, about one-half of each: the darker grounds are generally covered with a white powder, which seems necessary, as well as the white eye, to guard the flower from the scorching heat of the sun's rays."

It is observed, that all flowers that want any of the above properties are turned out into the borders of the garden or rejected wholly by every good florist; for as there are varieties every year from seeds, the bad ones must make room for their betters: but in some the passion for new flowers so much prevails, that supposing the old flower to be greatly preferable to a new one, the latter must take place, because it is of their own raising.

Culture.—These beautiful plants are raised without much difficulty, by proper care and attention in their management with respect to the parting of the roots, and the planting them out in their due season; they succeed best in a strong soil, and some of them, as the Primrose kind, in a shady situation.

Culture in the Polyanthus kinds.—These are all capable of being increased by seed and the parting of the roots, the former being the only method for obtaining new varieties, or a large supply of plants. The seed should be collected from such flowers as have large upright stems, and which produce many flowers upon the stalk, being large, beautifully striped, open, flat, and not pin-eyed, as from such seed a great variety of good sorts may be expected; care should be however taken that no bad or common flowers stand near them, as they will be apt to debase them, by the admixture of their farina.

The seeds should be sown in boxes or large pots filled with light rich mould. The proper season for this business is in the autumn, or the early spring; but the former is the better, as by sowing then the plants come up well the same year, and are strong and fit to plant out the following spring, and are fine plants for flowering the second spring. In the first season the sowing should be performed as soon as possible after the seed becomes well ripened, though some advise December as a good time; but when in the latter, or the spring season, it may be done in February, March, or the following month. The seed should be sown over the surface tolerably thick, being covered in very lightly, and the boxes or pots placed where they may have a little of the morning sun, but not by any means the mid-day heats. The plants may be much forwarded by the pots or boxes being plunged in a mild hot-bed; in the spring, when dry, they should be frequently refreshed with water, in very moderate proportions at a time, removing the plants more into the shade as the heat advances, as it soon destroys them. The autumn-sown plants should have a warm situation during the winter, or be protected from frosts or severe weather by glasses or other means.

In the spring or early summer the plants of the different sowings will be sufficiently strong to plant out, for which a bed or shady border should be prepared, and made rich by neat's dung, on which the plants should be set out about four or five inches distant in every direction, care being taken to water them occasionally till well rooted, after which they only require to be kept free from weeds; and when they flower in the following spring the best flowers should be marked, and the rest be removed into the borders or other places for affording variety; and the valuable plants may be removed, when they have finished flowering, into the borders or beds where they are designed to flower and remain, in the same manner as above, watering them slightly till well rooted again. The roots afterwards require to be parted and removed annually, and the earth of the borders renewed, to prevent their degenerating.

It is necessary, in order to keep up a proper stock of plants, to raise new seedling plants every two or three years, as the old plants mostly decline in beauty after the third year.

In the latter method, the roots should be parted in the beginning of the autumn, as soon as the flowering is over, and it may likewise be done early in the spring; but the former is the best time, as the plants get stronger and flower better in the spring.

In performing the work the plants should be taken up out of the ground, and each bunch divided into several slips, not too small, unless where a great increase is wanted, being careful to preserve some root to each slip; they are then to be planted in a fresh dug border, enriched with dung as above, setting them five or six

inches asunder, giving them water directly, and repeating it occasionally till they have taken good root. The approved sorts may in this way be easily preserved.

These plants are observed by the editor of Miller's Dictionary to be very liable to the depredations of snails and slugs, in the spring of the year; the plants and pots therefore should be carefully examined on all sides early in the morning. But their worst enemy is a small red spider or Acarus, which in summer forms its web on the under side of the leaves. These little insects, scarcely visible without a magnifying glass, cause the leaves to become yellow and spotted, and eventually destroy the plant: they multiply with such rapidity as to take possession of a whole collection in a very short time. Such plants as appear infected should therefore be immediately selected from the rest, taken up, and soaked for two or three hours in a strong infusion of tobacco water, and then replanted in a fresh soil or compost, and removed to a situation at a distance from the former. But if the whole bed or border be overrun with this insect, it is best to take up all the plants, and, having soaked them, to plant them elsewhere. The bed or border should then be trenched up, and remain fallow to the next season, or be planted with another crop not liable to this calamity.

In their after-management, they are said to "blow at the same time, and require nearly the same treatment, as Auriculas, both with respect to soil and situation; they are however more impatient of heat and drought, and more partial to shade and moisture. They may be set in the same sized pots, and in the same compost as the Auricula, only with the addition of more loam; or they may be planted on cool shady beds or borders, being very hardy, and seldom perishing in the coldest and wettest seasons, because their parent is a native of this country; but during the heats of summer they are frequently destroyed, unless proper precautions be taken. This dislike of heat seems to indicate," it is added, "that the Polyanthus is rather the offspring of the Primrose, which requires shade, than of the Cowslip, which grows in open pastures; though Mr. Miller seems to regard it as a variety of the latter."

The roots of the wild plants, when they can be procured, may be taken up, divided, and planted out in the autumn, when they will flower in the following spring.

The fourth sort readily seeds in its wild state, and also frequently when cultivated: but it is scarcely worth the pains to raise it from seed, since a strong root may be divided so as to form many plants; the best time for doing this is in the spring, soon after the leaves are expanded. Each off-set should be placed in a separate pot, filled with two parts of stiffish loam, and one part of light sandy bog earth, watering and setting them in the shade, under a north wall or paling, but not under trees, keeping them there during summer in pans of water, but in the autumn, as the wet season comes on, taking them out of the pans, and either laying the pots on their sides, or placing them during winter under a common cucumber frame, to keep them from immoderate wet, which this plant cannot bear, although it be a native of boggy meadows. In the following if not the same year these plants will blow strong; and they should be thus treated every year, as they require to have their roots frequently parted.

The fifth sort is increased by parting the roots, either in September or at the beginning of March. It is hardy, of ready growth, and will succeed either in the pot or border, by guarding it from the sun in summer and from severe frost and too much wet in winter.

The sixth species, which is yet a rare plant, must be treated with care, as the fifth sort, and may be raised from seeds, or increased by parting the roots; but it is apt to be lost if not well attended to.

The seventh sort is delicate, and should be placed in a pot of stiffish loam, mixed with one-third rotten leaves, bog-earth, or dung, and plunged in a north border, taking care that it does not suffer for want of water in dry seasons; as when thus treated it increases by its roots nearly as readily as the Auricula.

Culture in the Auricula kinds.—These plants may all be increased by seeds in order to procure new varieties, and by slipping the roots to increase the approved kinds.

In order to obtain good flowers from seeds, choice should be made of the best flowers, which should be exposed to the open air, that they may have the benefit of showers, without which they seldom produce good seeds: the time of their ripening is in June; which is easily known, by their seed-vessels turning to a brown colour, and opening, being then careful lest the seeds be scattered out of the vessel, as they will not be all fit to gather at the same time.

The proper soil for this sort of seed is good, fresh, light, sandy mould, mixed with very rotten neat's dung, or very rotten dung from the bottom of an old hot-bed; with which the pots, boxes, or baskets in which the seeds are to be sown should be filled; and having levelled the surface very smooth, the seeds should be

sown sifting over them a little rotten willow mould; then covering them with a net or wire, to prevent cats or birds from scratching out, or burying the seeds so as to destroy them. Some persons never cover the seeds, but leave them on the surface, for the rain to wash them into the ground, which is often the best method. The boxes, &c., should then be placed so as to receive half the day's sun, during the winter season; but in the beginning of March be removed, where they may have only the morning sun till ten o'clock; for the young plants now soon begin to appear, which, if exposed to one whole day's sun only, are all destroyed. The proper season for sowing the seed is in the latter end of summer, or beginning of autumn, as about September, but they may be sown in the spring.

During the summer season, the plants in dry weather should be often refreshed with water, never giving them too great a quantity at once. In the July following, the plants will be large enough to remove, at which time a bed must be prepared, or boxes, filled with the abovementioned soil, in which they may be planted about three inches apart, and shaded when in beds, every day, till they are thoroughly rooted, as also in very hot dry weather; but if they are in baskets or boxes, they may be removed to a shady situation.

When planted in beds, there should be some rotten neats' dung laid about ten inches under the surface, and beaten down close and smooth: this will prevent the worms from drawing the young plants out of the earth, which they generally do where this is not practised. This dung should be laid about half a foot thick, which will entirely prevent the worms getting through it until the plants are well established in the beds; and the roots strike down into the dung by the spring, which makes their flowers stronger than usual: these beds should be exposed to the east, and screened from the south sun as much as is necessary.

In the spring following many of these flowers will show; when such of them as have good properties should be selected, which should be removed each of them into a pot of the same prepared earth, and preserved until the next season, at which time a judgment of the goodness of the flower may be formed; but those that produce plain-coloured or small flowers should be taken out, and planted in borders in the out-parts of the garden, to make a show, or gather for nosegays, &c.; the others, which do not produce their flowers the same year, may be taken up, and set out into a fresh bed, to remain till their properties are known.

In the second method, the offsets or slips may be taken from the old roots, in the spring or autumn, and be planted into small pots filled with the same sort of earth as was directed for the seedlings, and during the summer season be set in a shady place, and must be often gently refreshed with water, and in the autumn and winter be sheltered from violent rains. In the spring following these plants produce flowers, though but weak; therefore, soon after they are past flowering, they should be put into larger pots, and the second year they will blow in perfection.

In order to obtain a fine bloom of these flowers, the plants should be preserved from too much wet in winter, which often rots and spoils them, letting them have as much free open air as possible; but not be too much exposed to the sun, which is apt to forward their budding for flower too soon; and the frosty mornings, which often happen in March, thereby destroying their buds, if they are not protected; to prevent which, those who are curious in these flowers place their pots in autumn under a common hot-bed frame, where, in good weather, the plants may enjoy the full air, by drawing off the glasses; and in great rains, snow, or frost, be screened by covering them.

About the beginning of February, when the weather is mild, the upper part of the earth in the Auricula pots should be taken off as low as can be, without disturbing their roots, filling up the pots with fresh rich earth, which greatly strengthens them for bloom. As those plants which have strong single heads always produce the largest clusters of flowers, the curious florist should pull off the offsets as soon as it can be done with safety to their growing, to encourage the mother plants to flower the stronger; they should also pinch off the flowers in autumn, where they are produced, and not suffer them to open, that the plants may not be weakened by it. The pots should be covered with mats in frosty weather, during the time of their budding for flower, lest the sharp mornings blight them, and prevent their blowing. When the flower-stems begin to advance and the blossom buds grow turgid, they must be protected from hasty rains, which would wash off their white meally farina, and greatly deface the beauty of their flowers, keeping them as much uncovered as possible, otherwise their stems will be drawn up too weak to support their flowers, (which is often the case when their pots are placed near walls) giving them gentle waterings to strengthen them, but none of the water should be let fall into the centre of the plant, or among the leaves.

When the flowers begin to open, their pots

should be removed upon a stage (built with rows of shelves, one above another, and covered on the top, to preserve them from wet: this should be open to the morning sun, but sheltered from the heat of the sun in the middle of the day): in this position they will appear to much greater advantage than when they stand upon the ground; for, their flowers being low, their beauty is hid; whereas, when they are advanced upon shelves, they are fully seen. In this situation they may remain until the beauty of their flowers is past, when they must be set abroad to receive the rains, and have open free air, in order to obtain seeds, which will fail if they are kept too long under shelter. When the seed is ripe it should be gathered when it is perfectly dry, and exposed to the sun in a window upon papers, to prevent its growing mouldy, letting it remain in the pods till the season for sowing.

It is observed by the editor of Miller's Dictionary, that "those who are very nice in raising Auriculas, direct the compost to be made of one half rotten cow-dung two years old; one sixth fresh sound earth of an open texture; one eighth earth of rotten leaves; one twelfth coarse sea or river sand; one twenty-fourth soft decayed willow wood; one twenty-fourth peaty or moory earth; one twenty-fourth ashes of burnt vegetables, to be spread upon the surface of the other ingredients. This compost is to be exposed to the sun and air, turned over once or twice, and passed as often through a coarse screen or sieve; then be laid in a regular heap from fifteen to eighteen inches thick, and in this state remain a year, turning it over two or three times, and keeping it free from weeds."

It is added, that "the pots for Auriculas should be hard baked: the inner diameter of the top be six inches and a half, of the bottom four inches, and they should be about seven inches deep, for common-sized blooming plants: but smaller plants and offsets should have smaller shallower pots, and very large plants should have larger pots in proportion; the bottom should have a small degree of concavity, and the hole should be half an inch in diameter: the rims should project about half an inch, in order to take up and remove them with greater ease and safety. The pots should be buried in wet earth, or immersed in water three or four days or a week, before they are wanted, to take off their absorbent property."

In the after-management of the plants, they should be potted annually soon after bloom; curtailing their fibres, if grown very long, and cutting off the lower part of the main root if too long or decayed. The offsets at this season strike freely, and become well established before winter. The plants should be carefully examined, and where any unsoundness appears, be cut out entirely with a sharp penknife, exposing the wounded part to the sun, and when it is quite dry, applying a cement of bees-wax and pitch in equal quantities, softened in the sun or before a fire. If the lower leaves be yellow or dried up, they should be stripped off in a direction downwards. Having put the hollow shell of an oyster over the hole of the pot, three parts of it should be filled with compost, highest in the middle, placing the plant there, with its fibres regularly distributed all round; then filling the pot up with the compost, adding a little clean coarse sand close round the stem on the surface, and striking the bottom of the pot against the ground or table to settle the earth. The true depth of planting is within half an inch of the lowest leaves, as the most valuable fibres proceed from that part; and the offsets will be thereby encouraged to strike root sooner. When these have formed one or more fibres of an inch or two in length, they may, by means of a piece of hard wood, or by the fingers, be separated with safety, and planted round the sides of a small pot, filled with the same compost; till they are sufficiently grown to occupy each a separate pot: if a small hand glass be placed over each pot it will cause the fibres to grow more rapidly; but if it be long continued, it will draw up and weaken the plants. And in the beginning of May, as soon as the operation of potting is finished, the plants should be placed in an airy, shaded situation, but not under the drip of trees. Here they may remain till September or October, when they should be removed into shelter.

The plants should, in the first favourable weather in February, be divested of their decayed leaves; and by the middle of that month earthing them up; that is, taking away the superficial mould of the pots about an inch deep, and putting in fresh compost, with the addition of a little loam, to give it more tenacity. This contributes greatly to the strength of the plants, and the vigour of their bloom; at the same time it affords a favourable opportunity to separate such off-sets as appear to have sufficient fibre to be taken off at this early season. The pots with these off-sets should be placed in a frame, in a sheltered situation till their roots are established. Though frost, unless it be very rigorous, will not destroy the plants, it will injure them, and perhaps spoil the bloom, especially early in the spring; they should therefore be covered with mats in a severe season. When any plant has more than one or two principal stems, it is ad-

visable to pinch off the smallest and weakest, in order to render the blossoms of that which remains larger and more vigorous. And when the flowers (pips) become turgid and begin to expand, the plants should be selected from the rest, removing them to a calm shady corner, suspending small hand-glasses over them.

In this culture the stages for the pots to stand on whilst in bloom should have a northern aspect, and should consist of four or five rows of shelves, rising one above another, the roof being covered with frames of glass; the tallest blowing plants being placed behind, and the shortest in front. The plants must be regularly watered two or three times every week during the blooming season.

All these plants are highly ornamental; the former in beds and borders, and the latter sorts among curious potted flowering plants.

PRINCE'S FEATHER. See AMARANTHUS.

PRINCE'S WOOD. See CORDIA and HAMELIA.

PRINOS, a genus containing plants of the deciduous and evergreen shrubby sorts.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Dumosæ*.

The characters are: that the calyx is a one-leafed perianth, half-six-cleft, flat, very small, permanent: the corolla one-petalled, wheel-shaped: tube none: border six-parted, flat: segments ovate: the stamina have six awl-shaped filaments, erect, shorter than the corolla: anthers oblong, blunt: the pistillum is an ovate germ, ending in a style shorter than the stamens, and an obtuse stigma: the pericarpium is a roundish berry, six-celled, much larger than the calyx: the seeds solitary, bony, obtuse, convex on one side, angular on the other.

The species cultivated are: 1. *P. verticillata*, Deciduous Winter Berry; 2. *P. glabra*, Evergreen Winter Berry.

The first rises with a shrubby stalk to the height of eight or ten feet, sending out many branches from the sides the whole length: the leaves are lanceolate, about three inches long, and one inch broad in the middle, terminating in an acute point, of a deep green, veined on the under side, alternate on the branches upon slender footstalks: the flowers come out from the side of the branches, single or two or three at each joint: the berries are the size of those of Holly, turning purple when ripe. It flowers in July.

The second species has leaves alternate, petioled, oblong, of a firm texture, smooth, acute: there are commonly two serratures towards the tip: the peduncles axillary, small, commonly three-flowered. It is of lower growth than the preceding; the leaves are shorter and serrate at their points only. It is a native of Canada, flowering in July and August.

Culture.—In these plants it is effected by seeds, sown soon after they are ripe, or early in the spring, upon a bed of light earth, covering them about half an inch with the same sort of earth: but the seeds which are put into the ground in the autumn will many of them come up the following spring, while those which are kept longer out of the ground, often remain a whole year before the plants appear, as in Holly, Hawthorn, and some others. The seeds may be forwarded in their growth by means of a hot-bed. When the plants have sufficient strength they should be planted out, some in nursery-rows and others in pots. They delight in a moist soil and a shady situation. In hot land they make little progress, and rarely produce any fruit.

They are ornamental, and afford variety in the pleasure-grounds and among potted plants.

PRIVET. See LIGUSTRUM.

PRIVET, MOCK. See PHILLYREA.

PROTEA, a genus containing plants of the ornamental shrubby exotic kind.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Aggregatæ*.

The characters are: that the calyx is a common perianth, usually imbricate: scales permanent, various in form and proportion: perianth proper none: the corolla universal uniform: proper one, two or four petalled, with the petals different in figure: the stamina have four filaments, inserted into the petals below the tip: anthers linear: the pistillum is a superior germ, awl-shaped or roundish: style filiform: stigma simple: there is no pericarpium: calyx unchanged.

The species cultivated are: 1. *P. conifera*, Cone-bearing Protea; 2. *P. argentea*, Silvery Protea.

There are several other species that may be cultivated for variety.

The first has a stem erect, three feet high, with branches in whorls and subdivided: the leaves terminated by a concave smooth gland: the cone tomentose ovate, the size of a pea: the branches are in whorls and again subdivided, the leaves elliptic, the cone of flowers tomentose, and the floral leaves concolour.

The second species has a strong upright stalk, covered with a purplish bark, dividing into several branches which grow erect: the leaves broad, shining, silvery, making a fine appearance, when the plant is intermixed with other exotics. It flowers in August.

Culture.—These plants are increased by seeds, procured from the places of their native growth; which, as soon as obtained, should be sown in pots, filled with sandy loam, and placed in a moderate hot-bed; and when the plants are come up, moderate air should be given, or they should be placed in an airy glass case, or towards the front of a green-house; and be afterwards managed as other similar exotics of that kind.

They are also sometimes raised by cuttings, in spring and summer, by the assistance of a hot-bed, in the same manner. They should not have much water afterwards, nor be treated in too tender a manner.

They are ornamental among other potted plants.

PRUNING OF TREES. The operation of occasionally cutting out parts, in order to give them any desired form, and to retrench or reduce irregular and redundant or superfluous growths.

It is particularly necessary to be practised on many sorts of fruit-trees, more especially the dwarf sorts, such as all kinds of wall and espalier fruit-trees; it is also necessary, occasionally, for standard-trees, both dwarfs and half and full standards, and for some sorts annually, as all kinds of wall-trees, espaliers, and most other dwarf or trained fruit-trees; which is done in order to preserve the proper figure, and to keep them within their limited bounds, as well as to promote fruitfulness; but as to common standards, whose heads have full scope of growth every way, they require but very little pruning, except just to retrench any occasional redundancy, ill-growing branches, and dead wood. Wall-trees and espaliers require a general regulation in this way, twice every year: in summer, to retrench the evidently superfluous and ill-placed shoots of the year, and to train in a supply of the most regular ones; and in winter to give a general regulation both for the supply of young wood left in summer, and to the old branches where necessary.

In pruning these sorts of trees, as they have their branches arranged with regularity to the right and left, one above another, in a parallel manner, four, five, or six inches asunder, and forming a regular spread, so as the branches of each tree completely cover a certain space of wall, &c., and as the whole spread of branches constantly send forth every year a great number of unnecessary and useless shoots, each should be limited to a certain space. An annual pruning is consequently necessary to retrench the redundancies, and all irregular and bad shoots, to give the proper bearing branches due room, as well as to confine each tree within its proper limits, consistent with its regular form.

The first pruning for wall fruit-trees, to give the head its first regular formation, is effected by pruning short or heading down in spring all the shoots produced the first year from budding and grafting, and when a year old being mostly pruned down in March, within four or five eyes of the bottom, to throw the sap more into the remaining lower buds, and thus, instead of running up to one stem, to push forth several strong shoots from the lower part the ensuing summer, so as to fill the necessary space of walling and espalier regularly quite from the bottom, which shoots being trained straight and regular in a spreading manner, each at full length all summer; and in the winter or spring following, where a supply of more principal shoots shall seem necessary to form the head more effectually, pruning short also these shoots, each to four or five eyes, when they will throw out the same number of shoots the same year, which, according as they advance in length, should be trained at regular distances at full length during the summer, for the shoots of wall-trees should not in general be shortened in the summer season, as that would cause them to push forth many superfluous unnecessary lateral shoots; though sometimes, in order to fill a vacancy as soon as possible, strong young shoots, by being pinched or pruned early in the season, as May or beginning of June, to four or five eyes, will throw out several proper shoots the same summer. The work of pruning short should be occasionally repeated one or two years, either in general or on particular shoots, as may seem necessary, till a proper set of branches are by that means obtained to give the head of the tree a proper formation; afterwards it may be omitted, except occasionally to any particular shoot to fill a vacant space; but some sorts of wall-trees require almost a general shortening of their supply of shoots, such as peaches, nectarines, &c., which bear only on the young wood, have that of each year shortened, to force out a supply of shoots for future bearing: other sorts of wall-trees and espaliers are not, in the general course of pruning, to be shortened, such as pears, apples, plums, and cherries, which continue bearing in the same wood of from two or three to many years' growth. See ESPALIERS.

When the trees have been thus furnished with a proper spread of branches trained regularly to the wall and espalier, they every year throw out many more shoots than are wanted, or can be converted to use, by some being too numerous, others ill placed, and others of a bad growth; all of which must therefore be regulated accordingly by proper pruning; as the regular figure of the tree, by being well furnished in

every part equally from the bottom to the top of the wall or espalier with proper branches, capable of producing good fruit, is the principal object of this operation.

In performing it the operator should be careful to free the trees of every thing that is superfluous, irregular, or hurtful, both in the summer and winter prunings. Those branches are superfluous, which though good and well placed, are more than wanted or that can be properly laid in, and those irregular which are so ill placed as not to be trained with regularity to the wall or espalier, such as all fore-right shoots, being such as grow immediately from the front or back of the branches in a fore-right direction; and those are hurtful which are of bad growth, such as all very rank or singularly luxuriant rude shoots. The superfluous or redundant growths should of course be thinned by pruning out all that seem to cause confusion; and the irregular and hurtful rank shoots be displaced, cutting all these off quite close to the place whence they proceed, only leaving a proper supply of the regular or best placed side-shoots where necessary, so as to preserve every part well furnished with bearing wood, trained straight and close to the wall or espalier, at equal distances. Some sorts of wall-trees, &c., however, require a general annual supply of young wood, such as peach and all other trees which bear only on the shoots of a year old; others require only an occasional supply of wood, such as apples, pears, &c., and all other kinds that bear on the old wood of from two or three to ten or twenty years old or more; so that the same branches continue in bearing many years, and the trees require only a supply of young shoots now and then to replace any worn out or dead branches. See SUMMER and WINTER PRUNING.

This art chiefly consists in being acquainted with the nature of bearing in the different sorts of trees, and in the forming an early judgment of the future event of shoots and branches, as well as other circumstances, for which some rules may be given; but there are particular instances which cannot be judged of but upon the spot, and depend chiefly upon practice and observation.

With regard to the nature or mode of bearing of the different sorts of wall- and espalier-trees, &c. peaches, nectarines, apricots, &c., all produce their fruit principally upon the young wood of a year old; that is, the shoots produced this year bear fruit the year following, and the same of every year's shoots; so that in all these trees, a general supply of the best regular shoots of each year should be every where preserved, both in the summer and winter prunings, at regular distances quite from the bottom to the extremity of the trees on every side, in such order as to seem coming up regularly one after another; and trained principally all at full length during their summer's growth; but in the winter pruning generally shortened, according to the strength of the different shoots, in order to promote their throwing out more effectually a supply of young wood the ensuing summer, from the lateral eyes, in proper places for training in for the next year's bearing; the fruit-buds being mostly produced along their sides immediately from the eyes, as they rarely form any considerable fruit-spurs, as in the apple, pear, &c., the same shoots producing the fruit and a supply of shoots at the same time for the succeeding year's bearing. All these trees also bear on casual small natural spurs, sometimes arising on the two and three years' wood, one or two inches in length, which are generally well furnished with blossom buds in the proper season; and should be preserved for bearing; always however depending on the main young shoots as the principal bearers.

Vines also produce their fruit always upon the young wood, shoots of the same year arising from the eyes of the last year's wood only, and must therefore have a general supply of the best regular shoots of each year trained in, which in the winter pruning should be shortened to a few eyes or joints, in order to force out shoots from their lower parts only, properly situated to lay in for bearing fruit the following year.

Figs bear also only upon the young wood of a year old, a general supply of it is of course necessary every year; but these shoots should at no time be shortened, unless the ends are dead, as they always bear principally towards the extreme part of the shoots, which if shortened would take the bearing or fruitful parts away. And these trees mostly throw out naturally a sufficient supply of shoots every year for future bearing without the precaution of shortening them.

And as to apple-, pear-, plum-, and cherry-trees, they bear principally generally on spurs arising in the general branches, of from two or three to ten or twenty years old, the same branches and spurs continuing bearing a great number of years, as has been seen, so that having once procured a proper set of branches, in the manner already directed, to form a spreading head, no further supply of wood is wanted than only some occasional shoots now and then to supply the place of any casual worn-out or dead branch as before suggested; these spurs or

fruit-buds are short robust shoots, of from about half an inch to one or two inches long, arising naturally in these trees, first towards the once extreme parts of the branches of two or three years old; and as the branch increases in length, the number of fruit-buds increases likewise; this therefore determines, that in the general course of pruning all these kind of trees, their branches that are trained in for bearing must not be pruned or shortened, but trained at full length, as where shortened it would divest them of the parts where fruit-buds would have first appeared, and, instead thereof, would throw out a number of strong unnecessary wood-shoots, from all the remaining eyes; therefore all the shoots or branches of these trees should be trained principally at full length, and as they advance still continue them entire. When however there is a vacancy, and only one shoot, where two or three may be requisite, pruning or shortening is allowable to force out the proper supply. See DWARF TREES.

In these trees care is necessary to preserve all the proper fruit-buds or spurs, which are readily distinguished by their short, thick, robust growth, rarely exceeding one or two inches in length.

In the course of pruning all sorts of wall- and espalier-trees, all improper and ineffectual shoots and branches, necessary to be displaced, must be taken off quite close to the place whence they arise; which in the summer pruning, if attended to early, while the shoots are young and tender, may readily be rubbed off close with the thumb; but when the shoots become older and woody, as they do not readily break, it must be done with a knife, cutting them as close as possible: all winter pruning should however be performed with a knife.

In pruning in summer, the necessary supply of regular shoots that are left for training in, should never be shortened, unless to particular shoots to fill a vacancy, or to reduce within bounds any too long extended shoots; as by a general shortening in this season, all the shoots so treated would soon push again vigorously from every eye, and run the trees into a perfect thicket of useless wood; therefore all sorts, whether they require shortening in the winter pruning or not, should, in the summer dressing, be layed in at full length.

Summer Pruning.—This is a necessary operation, as in spring and summer wall- and espalier-trees abound with a great number of young shoots that require thinning and other reforms to preserve the requisite regularity and beauty of the trees, and encourage the fruit; and the sooner it is performed, the better; it is therefore advisable to begin in May or early in the following month, and disburthen the trees in time of all redundant or superfluous growth, and ill placed and improper or bad shoots; which may be then performed with more expedition and exactness than when delayed till after the trees have shot a considerable length and run into confusion and disorder: besides the injury of the fruit is prevented. It is therefore of importance to proceed in this operation early, when the same year's shoots are sufficiently formed to enable you to make a proper choice.

The business now is to thin and regulate the unnecessary shoots, by pruning away the superfluous ones, and all such as are ill-placed and of bad growth, retrenching the most irregular-placed, weakest, and all such as are evidently not wanted for use, and where two or more shoots any where arise from the same eye, clearing all away but one of the best, reserving a sufficiency of the moderately strong and most regular-placed side shoots, and always a leading one at the end of every branch, where it commodiously occurs; all of which should be retained to be regularly trained in to choose from in the winter pruning, leaving more or less in proportion, according to what the trees are, or the mode of bearing, though in all those trees that bear always on the young wood, at least doubly or trebly more shoots should be left in this pruning than what may appear necessary, especially of peaches, nectarines, apricots, vines, figs, &c., as it is highly requisite to reserve plenty of regular young wood in summer, to choose from in winter pruning, to lay in for next year's bearers; but as to apples, pears, plums, cherries, &c., which continue bearing many years on the same branches, only here and there some good well-placed shoots need be left towards the lower parts, or in any vacancy between the main branches till winter; and if then not wanted, be easily retrenched.

Where, however, a tree is in general inclined to luxuriancy, it is proper to retain as many of the regular shoots as can be commodiously trained in with any regularity, in order to divide and exhaust the too abundant sap, which causes the luxuriancy; as by humouring somewhat the natural inclination of luxuriant trees by leaving plenty of branches and these mostly at full length, they may the most readily be reduced to a more moderate state of growth.

Great attention should always be paid to the lower parts of the trees, as it is frequently the case to find proper shoots arising in places necessary to be trained in, either to supply a present or future vacancy, or as a reserve to replace any decayed or worn-out or other bad branch, so that if moderately strong well-

placed shoots arise in such parts, they are particularly to be regarded at this time; and in winter pruning, such of them as are not wanted may be easily cut out and removed: but all weak trifling shoots should now be taken out.

After having summer-pruned and cleared any tree from all useless shoots, all the remaining proper shoots should be directly, or as soon as they are long enough, trained in straight and close to the wall or espaliers, at full length. When there is any great vacancy in some particular part, it may however be proper to cut or prune one or more contiguous shoots to three, four, or five eyes or buds, in order to promote an emission of laterals accordingly the same season, more effectually to supply the vacant spaces; but all the rest should be trained at full length till winter pruning, when they must undergo another regulation. Those of such trees as require it, as peach, nectarine, &c., should be shortened.

The work of training in the shoots in this season, is performed when against walls, both by nailing, by means of proper shreds and nails, and occasionally, by fastening in the smaller shoots, with little sticks or twigs stuck between the main branches and the wall; and for espaliers, by tying them with small osiers, rushes, or bass strings.

After having thus summer-dressed and trained the trees, it will be necessary to look them occasionally over, in order to reform such branches or shoots as may have started from their places or taken a wrong direction, and according as any fresh irregular shoots are produced, they should be displaced; and likewise as the already trained shoots advance in length or project from the wall or espalier, be trained in close, continuing them at full length during their summer's growth; every thing being kept close and regular, by which the trees will appear beautiful to the eye, and the fruit show itself, and attain its due perfection more effectually.

Winter-Pruning.—In this pruning, a general regulation must be produced both in the mother branches, and the supply of young wood laid in the preceding summer. The proper time for this work is, in most wall-trees, any time in open weather, from the fall of the leaf in November until March. And in performing the business, it is proper to unnail or loosen a great part of the branches, particularly of peaches, nectarines, apricots, vines, and such other trees, as require an annual supply of young wood, and considerable regulation in the general branches.

All the principal or mother branches should first be looked over, and examined, to see if any are worn out or not furnished with parts proper for bearing fruit, and such branches be cut down either to the great branch from which they proceed, or to any lower shoot or good branch they may support toward their bottom part, leaving these to supply its place; likewise examining if any branches are become too long for the allotted space either at sides or top, and reforming them accordingly, by shortening them down to some lower shoot or branch properly situated to supply the place; being careful that every branch terminates in a young shoot of some sort for a leader, especially in all parts where room to extend them, according as the limited space admits, having the leader either placed naturally at the termination of the branch; or, where too long in any particular parts of the tree, pruned conformably to some lower shoot, &c., so as that it may still terminate in a proper leader, and the extended branches not cut to naked stumpy or stubbed ends, as is often practised by inexperienced pruners. And from the principal or larger branches, pass to the young wood of the year: or, in proceeding both in the occasional reform among the principal or older branches, and more general regulation in the young wood of the year, or shoots of the preceding summer, the above intimations relative to the principal branches should be observed in the pruning in the whole, both on the old and young wood, and be carried on regularly together at the same time, cutting out or retaining according to circumstances; as for instance, in the older wood observing the above particulars, and as below, and in the general supply of young wood, cutting out close all fore-right and other irregular shoots that may have been omitted in the summer-pruning; likewise all very weak shoots, and those of very luxuriant growth, unless it be necessary to keep some to supply a vacant place; then of the remaining regular shoots, selecting a greater or smaller portion to leave either as a general supply for next year's bearing, as is requisite for peaches, nectarines, apricots, vines, and figs; or only in others some occasional shoots, such as in full-trained apple-, pear-, plum-, and cherry-trees, &c., either sometimes to furnish casual vacancies, or to supply the places of any defective or improper branches, or ineffectual bearers, as may casually occur, or that of decayed or dead wood.

But as peach, nectarines, apricots, vines, and figs, always bear principally on the year-old wood, as already noticed, a general supply of young shoots must be left in every part from

bottom to top at regular distances, and, at the same time, some proportional part of the most naked old wood, and of the two preceding years past bearers, be pruned out to make proper room for this requisite young successional supply of future bearers in the following summer, to be now retained in a general manner, both laterally, and as terminals to the general patent branches, which should be pruned accordingly; and mostly all the said supply of the present retained shoots, except the fig, must be more or less shortened according to their situation and strength, to encourage their furnishing more readily a proper supply of shoots in spring and summer for the succeeding year's bearing, as noticed before, leaving the strongest shoots always the longest, as is more fully explained under each of their respective *genera*; but as the figs always bear towards the end of the shoots they must not be shortened.

With respect to the apples, pears, plums, cherries, &c., as they continue to bear on the same branches of from two or three to many years standing, the said bearers must be continued accordingly; and the trees only require an occasional supply of young wood, according as any of the branches become defective, or unfit for bearing, and want removing; which should now be cut out as may seem necessary, training in here and there in proper places some good regular young shoots towards the lower part, and where it may seem necessary, to be coming gradually forward to a bearing state, to be ready to replace worn-out and other useless branches, to be cut out, as they may occur: and of the young wood, selecting what may appear necessary of the best well-placed shoots, and the superabundance, or those not wanted for that purpose, together with all irregular-placed shoots, rank luxuriants, and other ineffectual growths, should be now cut clean out, close to whence they originate, not leaving any spur or stump, as every one would push out several strong unnecessary shoots the next spring, to the prejudice of the trees and fruit: particular regard should be paid to preserve the shoots at the termination of all the already trained branches entire, but not more than one to terminate each branch; preserving also carefully all the proper fruit-spurs, taking care that the supply of young wood be occasionally reserved, and the branches in general of these trees be trained in at full length, and continued so in future, as far as the limited space will admit: and according as any extend above the wall or espalier or any where beyond their proper limits, they be pruned down with discretion to some convenient bud, or lateral shoot, or lower branch, which should be trimmed entire.

In this pruning, as in the summer dressing, it is of importance to have a strict eye to the lower parts of wall-trees, &c., to see if there is any present vacancy or any that apparently will soon happen; in which cases, if any good shoot is situated contiguous, it should be trained in either at full length, or shortened to a few eyes to force out two or more shoots if they shall seem necessary; for precaution should ever be observed in taking care to have betimes a sufficient stock of young wood coming forward to fill up any casual vacancy, and substituting a new set of branches in place of such as are either decayed or stand in need of retrenchment.

In wall-trees and espaliers there are sometimes many large disagreeable barren spurs, consisting both of old worn-out fruit spurs, and of clusters of stumps of shortened shoots projecting considerably from the branches, occasioned by unskilful pruning when retrenching the superabundant and irregular shoots, which, instead of being cut out close, are stumped off to an inch or two long, and in the course of a few years, form numerous barren stumps, and very little fruit, the trees appearing like a stumped hedge. In this season of pruning, (in this case) it is proper to reform them as well as possible by cutting all the most disagreeable stumps clean out close to the branches, leaving these at full length, especially in apples, pears, &c., and reserving an occasional supply of young wood in different parts: thus in two or three years such trees may be reduced to a regular figure and a proper state of bearing.

It is observed that bad pruning ruins many a good tree, as is observable in numerous gardens, where the wall-trees and espaliers appear as just described, pruned every year, yet never producing any tolerable crop of fruit.

Severe injudicious pruning in strong wood is greatly prejudicial to the health of some sorts of stone-fruit-trees, by causing them to gum and soon decay. Plums and cherries, in particular, are often greatly damaged by a too severe discipline of the knife, these being very liable to gum by large amputations: it is therefore of importance to attend to these trees well in the summer-pruning, to retrench all the superfluous and irregular shoots betimes in the summer while quite young, and pinch others occasionally where wood is wanted to fill vacancies, so as to require but little pruning out of large wood in winter.

A general nailing, &c., must every year be performed, according as the pruning advances,

as it is proper that every tree, as soon as pruned, be directly nailed to the wall, or if espaliers, tied or nailed to the treillage, being careful in the winter pruning, as the work of nailing, &c., will require to be performed more or less upon all the branches, to train them with great regularity, nailing them along horizontally, as straight and close as possible; never crossing any of the branches, but training them distinctly and parallel four to five or six inches asunder, or in proportion to the size of the leaves and fruit of the different sorts, making the opposite branches of each side arrange equally in the same manner and position.

Pruning of Standard Trees.—Standard fruit-trees require but very little pruning; for, as their branches have full scope above to extend themselves every way, they must not be shortened: besides, as the standard fruit-trees, consisting principally of apples, pears, plums, and cherries, bear fruit on natural spurs arising towards the upper parts of the branches, this determines that they must not be shortened, nor any other pruning be practised than just to reform any great irregularity, &c., in them. In these trees, the first occasional pruning necessary is the first two years of their growth, in order to form their heads somewhat regular, by retrenching any irregular shoots; and when designed to have them form more regular spreading heads, to prune the first shoots, when a year old, down to four or five eyes, in order to force out lateral shoots from these lower buds the following summer, to give the head a proper formation. After this, the branches should be suffered to take their natural growth, except that, if, while the trees are young, any very luxuriant shoots ramble away considerably from all the others, and draw most of the nourishment, it is proper to prune them, either by retrenching entirely very irregular ones, or shortening others to some regularity, to branch out consistently with the requisite form of the head of the tree; but except in such cases of reducing irregularities, the heads of all kinds of standards always should be left to branch away as fast as possible, both in length and laterally, agreeably to their natural mode of growing; and they will naturally furnish themselves abundantly with bearing wood.

In standard fruit-trees of some years' growth, as irregularities and disorder will occasionally happen, they should be regulated a little by pruning out the most conspicuously irregular and redundant growths in the winter season.

For instance; where any considerable branches grow right across others, or in any other awkward direction, to incommode or cause confusion, or much irregularity in the head, they should be retrenched close; likewise any branch that rambles considerably from all the rest, should be reduced to order, by cutting it down to some convenient lower branch, so as to preserve some regularity. Where the head is considerably crowded with wood, let the worst of the redundancy be thinned out as regularly as possible, cutting them close to their origin; and as sometimes very vigorous shoots arise in the heart of the tree, or towards the bottom of the main branches, growing upright, and crowd the middle of the head, they should be constantly retrenched to their very bottom; cutting out also any very cankered parts, and all decayed wood; and clearing off all suckers from the root and stem. The standard trees thus disburthened from any considerable irregularities and confusion, so as all the proper branches have full scope to spread free and easy in their natural manner, will not fail to repay the trouble in the superior quality of their future fruit. See Orchard-Trees.

Pruning of Forest Trees, &c.—With respect to pruning of forest and ornamental trees, flowering shrubs, &c., it is very inconsiderable. Forest trees, &c., must be suffered to run up as fast as possible, so that their heads should not be shortened; all that is necessary is, to prune off the lateral branches occasionally from the stem; or, if while young, any lateral shoot of the head, which is of a very rude rambling growth; but otherwise suffering the top and general branches of the head to remain entire, and take their own natural growth; only pruning the lower stragglers occasionally. It is however very improper to trim up the stem too high, as often practised to forest trees, as scarce to leave any upper branches to form a head: never, therefore, trim the stem much higher than the full spread of the principal branches, as a full head is both ornamental and essentially necessary to the prosperity of the tree. See Planting.

And as to the shrub kind, they should, for the general part, take their own growth at top; and only be pruned occasionally in any lower stragglers, from the inferior part of the stem, or any very irregular rambling shoot of the head, and all dead wood. Except in these cases, their heads mostly should be suffered to shoot in their own way, according to their different modes of growth, in which they will appear always the most agreeable. Where, however, it is required to keep shrubs low, they must be regulated, as convenient, with the pruning-knife, as being more proper than the garden-shears, which should never be used in that business to shrubs and trees in rural growth.

The particular method to be followed with

each sort of tree has been shown under the proper head to which it belongs.

Pruning Implements.—For the purpose of general pruning, several implements are necessary, such as pruning-knives, saws, chisels, hand-bills, hatchets, &c. Two or three different sizes of knives are requisite, in order to prune neatly; a strong one for cutting out larger branches, shoots, &c., and a small one for the more exact pruning among the smaller branches and shoots of peach and nectarine trees, &c. These knives are generally made curving at the point, and they should not be too long, broad, and clumsy, but have rather a shortish narrow blade, and but very moderately hooked at the point, for when too crooked they are apt to hang in the wood, and not cut clean; it is also proper to be furnished with a strong thick-backed knife, to use by way of a chisel occasionally, in cutting out any hard stubborn stumps, &c., placing the edge on the wood, and with your nailing hammer striking the back of it, and it will readily cut through even and smooth. A long knife with a concave edge, and a pruning-knife with a convex edge, are also recommended by Mr. Forsyth.

Hand-pruning saws are likewise proper for cutting out any large branch too thick and stubborn for the knife: these should be of moderate sizes, one being quite small and narrow, in order to introduce it occasionally between the forks of the branches, to cut to exactness.

And as saws generally leave the cut rough, it is proper to smooth it with a knife or a pruning-chisel.

The pruning-chisels are necessary to use occasionally, both to cut off any thick hard branches and large hard knotty parts, or stumps, and to smooth cuts in large branches, &c., after a saw; they should be flat, and from about one to two inches broad: sometimes large strong chisels, fixed on a long pole, are used in pruning or lopping branches from the stems of high standard forest trees, one man holding the chisel against the branch, while another, with a large mallet or beetle, strikes the end of the pole. A hand-bill and hatchet are also necessary to use occasionally among larger kinds of the standard trees.—See Tool.

All these pruning-tools, in their proper different sizes, may be had at the cutlery shops, and of the ironmongers, and many of the nursery and seedsmen.

PRUNUS, a genus containing plants of the fruit-tree, flowering and evergreen shrubby kind.

It belongs to the class and order *Icosandria Monogynia*, and ranks in the natural order of *Pomaceæ*.

The characters are: that the calyx is a one-leafed perianth, bell-shaped, five-cleft, deciduous: segments blunt, concave: the corolla has five petals, roundish, concave, large, spreading, inserted into the calyx by their claws: the stamina have twenty to thirty awl-shaped filaments, almost the length of the corolla, inserted into the calyx: anthers twin, short: the pistillum is a superior, roundish germ: style filiform, the length of the stamens: stigma orbicular: the pericarpium is a roundish drupe: the seed is a nut, roundish, compressed, with sutures a little prominent.

The species cultivated are: 1. *P. domestica*, Common Plum Tree; 2. *P. insititia*, The Bullace Plum Tree; 3. *P. Armeniaca*, Apricock or Apricot Tree; 4. *P. Cerasus*, Common or Cultivated Cherry Tree; 5. *P. Avium*, Small-fruited Cherry Tree; 6. *P. Padus*, Common Bird Cherry Tree; 7. *P. rubra*, Cornish Bird Cherry Tree; 8. *P. Virginiana*, Common American Bird Cherry Tree; 9. *P. Canadensis*, Canadian Bird Cherry Tree; 10. *P. Mahaleb*, Perfumed Cherry Tree; 11. *P. Caroliniana*, Evergreen Bird Cherry Tree; 12. *P. Lauro-cerasus*, Common Laurel; 13. *P. Lusitanica*, Portugal Laurel.

The first is a tree of a middling size, growing to the height of fifteen or twenty feet, branching into a moderately-spreading head: the leaves are on short petioles, which have one or two glands towards the end; they are slightly serrate and smooth; when young convoluted or coiled, and pubescent underneath: the peduncles short, commonly solitary: the calyx erect: the petals white, obovate: the drupe is an oblong spheroid, swelling a little more on one side and there grooved, of a blue colour, with a bloom on it: pulp yellowish, tender: the shell bony, ovate, pointed at both ends, and compressed: it loves a lofty exposure, and is a native of Asia and Europe. The cultivated garden Plums are all derived from this species.

The varieties of garden and orchard Plums are very numerous, differing in the form, taste, colour and substance of the fruit; but those mostly cultivated in this country are the following, according to Mr. Forsyth, and the times at which they ripen:

The Jaunhative, or White Primordian, which is a small plum, of a yellow colour, and mealy: it ripens in the latter end of July, or beginning of August: one tree of this sort will be sufficient for a garden of the common size. The Early Damask, which is commonly called the Morocco Plum, and which is middle-sized, and the flesh good: it ripens about the beginning of August, or sometimes a little later. The

Little Black Damask, which is a rich fruit, a good bearer, and becomes ripe about the latter end of August, or thereabouts. The Great Damask Violet of Tours, which is a fine rich plum of a blueish colour, and becomes ripe in August. The Red Orleans, which is large, of a rich juice, and becomes ripe in the latter end of August. The Fotheringham, which is an excellent plum, of a dark red, and the juice rich: there is hardly any plum that excels it, according to the opinion of some. The Blue Perdrigon, which is of a very good taste, and ripens in August. The White Perdrigon, which is a pretty good fruit, and has a sweetish taste mixed wish tartness: it ripens in the beginning of September. The Red Imperial, or Red Bonum Magnum, which is a great bearer, and mostly used for baking: it is ripe about the latter end of September. The White Imperial Bonum Magnum, or Egg, White Holland, or Mogul, which is a large fruit, and, like the Red, mostly used for baking: it is a great bearer, and ripens about the beginning of October. The La Royale, which is a fine plum, equal to the Green Gage, but a shy bearer: it is of a red colour, and ripens in the latter end of September. The Little Queen Claudia, which is a small rich fruit, becoming ripe in September. The Large Queen Claudia, or Dauphiny, which is an excellent plum, of a yellowish green, and ripens about the beginning of October. The Green Gage, which is of an exquisite taste, and eats like a sweetmeat: its colour and size sufficiently distinguish it from any other: it ripens in August and September: it has several subvarieties, all of which are of good qualities. The Drap d'Or, which is a good plum, and a plentiful bearer: it is ripe about the latter end of September. The Chester, which is rich, and a great bearer: it is ripe about the latter end of September. The Apricot, which is large and sweet, and is ripe in the beginning of October. The Maître Claud, which is a large round whitish plum: the juice is very brisk, though sweet: it is accounted among the best white plums that we have, and ripens about the beginning of October. The Myrobolanus, or Cherry Plum, which is a middle-sized sweet fruit, and ripens about the beginning of September: this plum is frequently planted for ornament, as it blossoms early. The La Mirabelle, which is of an amber colour, and small, but full of juice, and excellent for sweetmeats: it bears well, and becomes ripe about the beginning of September. The Brignole, which is esteemed the best plum of any for sweetmeats: the flesh is dry, but of a rich flavour: it is ripe about the latter end of September. The Red Diaper, which is large, and of a very high flavour: it ripens about the beginning of September. The Saint Catharine, which is one of the best, and is much used for confectionary; it is also very good for the table, having a rich sweet juice; and is a good bearer, hanging the longest of any upon the tree: Mr. Forsyth says, he has had them in gathering six weeks: it ripens about the latter end of September. The Imperatrice, or Empress, which has an agreeable flower, and ripens about the middle of October: it is one of the latest plums, and should not be gathered till it begins to shrivel; it will then eat like a sweetmeat, and make a great addition to the table in the latter end of October and beginning of November. Monsieur's, or the Wentworth, which is a large fruit resembling the Bonum Magnum: it ripens about the beginning of October, and is good for preserving, but too sharp to be eaten raw. The Winesour, or Yorkshire, which is one of the best for preserving: it is ripe in October. The Damson, of which a fine large sort from Shropshire, raised from suckers or stones, is an abundant bearer, of a rich flavour, and good for baking or preserving: it ripens in the latter end of September, and continues till near the latter end of October to be good and fit for use.

To these Mr. Forsyth adds the following list: The Admirable, the Black Damascene, the Black Pear, the Blue Matchless, the Damas Noir de Tours, the Don Carloses, the Double-flowered, the Early Blue Primordian, the Early Red Primordian, the Early Amber, the Early Tours or Precoce de Tours, the Early Violet, the Early Orleans, the Fine Early Plum, the Jacinthe or Hyacinth, the Koa's Imperial, the La Prune Suisse, the La Prune Valeur Valentia, the Matchless, the Maugeron, the Muscle, the Persian, the Red Queen Mother, the Royal Pea, the Royal Dauphin, the St. Julian, the Semina, the Small White Damascene, the Spanish Damascene, the Striped-leaved, the True Prune, the Verte-dock or Ver-dock, the Whitton or Nutmeg, the White Bullace, the White Orleans, the White Pear, the White Perdrigon.

The following sorts are recommended by the same writer as proper for a small garden: The Jaunhative, the Early Damask, the Orleans, the La Royale, the Green Gage in different sorts, the Drap d'Or, the Saint Catharine, and Imperatrice; the Magnum Bonum for baking; and the Winesour for preserving.

The second species is a tree which grows twelve or fifteen feet high or more: the branches are generally thorny: the leaves on short petioles, ovate attenuated at the base, serrate, villose underneath: the calyx is almost upright: the petals white, obovate: the drupe roundish,

The fruit is acid, but so tempered by sweetness and roughness as not to be unpleasant, especially after it is mellowed by frost. It is a native of Germany, flowering in April.

It varies with black, and white or rather wax-coloured fruit; and also with a red, bitter, unpleasant fruit.

The third is sufficiently distinguished by its broad roundish leaves drawn to a point at the end, smooth, glandular at the base in front, where they are sometimes slightly cordate, and unequal, that is, one side longer than the other: the edge is finely serrate: the petiole is from half an inch to an inch in length, commonly tinged with red: the vernant leaves convoluted, rolling upwards more or less; the leaves have a disposition to this at all times: the flowers are sessile, white tinged with the same dusky red that appears on the petioles: the fruit is round, yellow within and without, firmer than plums and most peaches, inclosing a smooth compressed stone, resembling that of the plum. It is a native of Asia.

There are many varieties of this; but the following are the most commonly cultivated, according to Mr. Forsyth: The Masculine, which is a small roundish fruit: it is the earliest of all the apricots, ripening about the latter end of July; and is chiefly esteemed for its tart taste: when fully ripe, it is of a red colour towards the sun, and of a greenish yellow on the other side. The Orange, which is pretty large, but rather dry and insipid, and fitter for tarts than for the table: it is of a deep yellow colour when ripe, which is about the latter end of August: this is considered as the best for preserving. The Algiers, which is a flatted-oval-shaped fruit, of a straw colour, juicy, and high-flavoured: it ripens about the middle of August. The Roman, which is larger than the Algiers, rounder, of a deep yellow, and not quite so juicy: it is ripe about the middle or latter end of August. The Turkey, which is larger, and of a deeper colour than the Roman; its shape more globular, and the flesh firmer and drier: it ripens about the latter end of August. The Breda, (brought from thence to England,) which is originally from Africa: it is large, round, and of a deep yellow colour; the flesh is soft and juicy: it is an excellent fruit, especially if ripened on a standard, becoming ripe about the latter end of August. The Brussels, which is held in very great esteem on account of its bearing so well on standards, or large dwarfs: it is of a middling size, red towards the sun, with many dark spots; and of a greenish yellow on the other side: it has a brisk flavour, is not liable to be mealy or doughy, and is preferred by many to the Breda; but when the Breda is planted as a standard, the fruit is more juicy and of a richer flavour: it ripens in August on a wall, but not before the latter end of September on standards. The Moor-Park, called also Anson's, Temple's, and Dunmore's Breda, which is a fine fruit, and ripens about the latter end of August. The Peach, which was introduced from Paris, by his Grace the Duke of Northumberland, at Sion-house, in 1767: it is the finest and largest of all apricots, and is generally thought to be the same as the Moor-Park; but upon a minute examination the leaves will be found to differ: it ripens in August. The Black, which has been very lately introduced, by Sir Joseph Banks, from France, in which country it is highly esteemed. It is observed, that "the trees that Sir Joseph planted in his gardens at Spring Grove, near Hounslow, bore fruit last season, (1792) for the first time in this country; but, in consequence of the wet and unfavourable weather, it did not arrive at perfection. It ripens about the second week in August."

To the above list Mr. Forsyth has added the following: The Great Apricot, the Holland Apricot, the Provence Apricot, the Alberge, the Angoumoise, the Blotched-leaved, the Nancy Apricot, which has a fine large fruit; the Dutch Apricot, the Grover's Breda, the Persian, the Royal Orange, the Transparent, the Portugal Apricot, which has a small fruit.

The following are advised as proper for small gardens, in order to have regular successions of fruit: The Masculine, the Roman, the Orange, the Breda, and the Moor-Park.

The fourth species is a tree that has ash-coloured, shining, roundish branches: the leaves petioled, ovate or ovate-lanceolate, acuminate, unequally serrate, veined; the younger ones folded together flat, and more or less pubescent underneath: the stipules toothed, glandular: the umbels leafless, few-flowered, nodding: the calyx reflex: the petals white: the drupe red and acid. It differs from the plum in having the stone nearly globular, with the kernel of the same shape. It is a native of Asia and Europe.

It loves a sandy soil and an elevated situation.

The varieties are numerous; but the following are those most in cultivation, according to the above author: The Small May Cherry, which is the first ripe, and requires a good wall: one or two trees of this kind may be sufficient for a large garden: it is ripe in June. The May Duke, which comes in about the same time as the former, but is larger: it is an excellent cherry, and bears well against a wall. The Archduke, which, if permitted to ripen properly, is an excellent cherry: it becomes ripe

in June and July. The Hertfordshire Cherry, which is a sort of Heart, but firmer and of a finer flavour than Hearts in general: it does not ripen till the latter end of July, or beginning of August, which renders it the more valuable, as it succeeds more early Cherries. The Bleeding Heart, or Gascoign's, which is a very large cherry of a long form, and dark colour: it has a pleasant taste, and ripens in the latter end of July. The Harrison's Heart, which is a fine cherry: it was introduced from the East Indies by Governor Harrison, grandfather to the present Earl of Leicester, and first cultivated at his seat of Balls in Hertfordshire: some of the trees, Mr. Forsyth is informed, he presented to George the First; and they are at this time in a flourishing state, bearing fine fruit, in Kensington Gardens: it is ripe in July and August. The Black Heart, which is a fine cherry, but too well known to require any description. The Morello, or Milan, which is a very fine fruit when kept till the month of October, and makes a very great addition to the dessert at that time of the year: it is the best cherry that we have for preserving, and for making cherry-brandy. The Carnation, which takes its name from its colour, being red and white: it is a large round cherry, but not so sweet as the Duke Cherry: it ripens in the latter end of July. The Yellow Spanish, which is of an oval shape and amber colour, and is a sweet pleasant fruit: it is ripe in August and September. The Corone, or Coroun, which resembles the Black Heart, and which is an excellent fruit, and a good bearer, ripening about the beginning of August. The Lukeward, which comes in soon after the former, and is also a fine pleasant fruit, and a good bearer: it ripens in the beginning of August. The Graffion, which is supposed by many to be the same with Harrison's Heart; but, upon a close examination, Mr. Forsyth finds it to be a different cherry: its flesh is firmer and the stone flatter: it ripens in July and August. Ronalds's Large Black Heart, which was introduced into this country in the year 1794 from Circassia, is a fine large cherry, a great bearer, and valuable as a forcing sort: it is well worth cultivating, ripening in the beginning of July. The Fraser's Black Tartarian, which is a fine large fruit. The Fraser's White Tartarian, which is white and transparent. These cherries are excellent bearers, but particularly the Black kind: the fruit is of a fine brisk flavour, and they ripen early. The Lundie Gean, cultivated at Lord Viscount Duncan's, near Dundee, which is black, and almost as large as a Black-Heart Cherry: Mr. Forsyth says, "it is now common in the nurseries about Edinburgh; and that Messrs. Gray and Wear have had it for some years in their nursery at Brompton-park." The Transparent Gean, which is a small delicious fruit.

To these the following list is subjoined: The Amber Heart; the Black Mazard; the Churchill's Heart; the Double-blossomed; the Flemish Heart; the Gross Goblet; the Holman's Duke; the Jeffrey's Royal; the Kensington Duke; the Large Spanish Cherry; the Late Large Morello; the Montmorency; the Ox Heart; the Purple Heart; the Red Heart; the Spanish Black; the South's Large Black; the Swedish Black Heart; the Tradescant's; the Turkey Heart; the Weeping; the Wentworth Heart; the White Heart.

The following are recommended as proper for a small garden: The May Duke; the Large Duke Cherry; the Archduke; the Black Heart; the Harrison's Heart; the Ox Heart; the Turkey Heart; and the Kensington Duke Cherry.

The fifth grows to be a large tree, fit for timber, and is frequently found growing as such in the woods. It is supposed to be a native of England.

The only varieties raised by seeds, from this, are the Black Coroun, and the Small Wild Cherry; of which there are two or three sub-varieties, differing in the size and colour of the fruit.

It is observed by the editor of Miller's Dictionary, that "the wild cherries are proper to plant in parks, because they grow to a large size and make beautiful trees. In spring, when they are in flower, they are very ornamental; the fruit is good food for birds; and the wood is very useful for turners. These trees thrive in poor land better than most other sorts. The French often plant them for avenues to their houses, on poor land; they also cultivate them in their woods, to cut for hoops; and the stones are generally sown for raising stocks, to graft or bud other Cherries upon, being of quicker growth and of longer duration." It is added that "the Garden Cherry grows only about fifteen or twenty feet high, whereas this attains forty or fifty feet in height, with a more erect and lofty head."

The sixth species rises to the height of ten or twelve feet, and, if permitted to stand, will have a trunk of nine or ten inches in diameter. The branches grow wide and scattering, and are covered with a purplish bark: the leaves ovate-lanceolate, alternate, slightly serrate: the flowers are in long loose bunches from the side of the branches: the petals white, much smaller than those of the Cherry: the flowers ranged alternately, each on a small pedicel: they have a strong scent, which is very disagreeable to most persons. They appear in May, and are suc-

ceeded by small roundish fruit, at first green, afterwards red, but when ripe black; inclosing a roundish furrowed stone or nut, which ripens in August. It is a native of most parts of Europe.

It is commonly propagated in the nurseries as an ornamental tree or shrub, growing well in woods, groves or fields, but not in a moist soil. It bears lopping, and suffers the grass to grow under it. It is sometimes called the Cluster Cherry Tree.

The seventh rises with a straight upright stem more than twenty feet high: the branches are shorter, and closer together than those of the sixth sort, and naturally form a regular head: the leaves are shorter and broader, and not so rough: the flowers grow in closer shorter spikes, standing more erect: the fruit is larger, and red when ripe. It flowers a little later than the sixth sort, as in May and June; and the fruit ripens in August. It grows naturally in Armenia.

The eighth species rises with a thick stem from ten to thirty feet high, dividing into many branches, which have a dark purple bark: the leaves are ovate, alternate, on short footstalks, of a lucid green, slightly serrate, and continuing in verdure as late in the autumn as any of the deciduous trees: the fruit is larger than that of the preceding, is black when ripe, and is soon devoured by birds: the wood is beautifully veined with black and white, and polishes well. It is a native of Virginia and other parts of North America.

In the ninth the branches are even: the leaves less rigid than in the others, finely serrate, green on both sides, but manifestly villose to the touch, and ending in the petiole at the base. It is a native of North America.

The tenth species is a low crooked tree: the wood is red, very hard, and sweet-scented: the leaves wide and pointed, approaching to those of the wild pear: the flowers white: the fruit black, yielding a bitter purple juice, the stain of which is not easily effaced: the stone is smooth, round, and a little flatted on the sides; inclosing a bitter perfumed kernel. The birds are very fond of the fruit. It is a native of Germany, Switzerland, Austria, &c. flowering in April and May. Ray calls it Rock Cherry.

The eleventh is rather a shrub, if we judge from its growth in this climate: the stalk does not rise more than three feet high, but sends out lateral branches spreading on every side, covered with a brown bark: the leaves are alternate on very short footstalks, near two inches long and three quarters of an inch broad, with small acute indentures on their edges; they are of a lucid green, continuing their verdure all the year. It is a native of South Carolina, flowering in May.

The twelfth species is a shrub sending off long spreading branches, covered with a smooth brown bark: the leaves are elliptical or obovate, slightly serrate, alternate, upon strong, short foot-stalks: the flowers on short axillary peduncles: the calyx ovate; segments reflex, pointed: the petals small, white: the filaments about eighteen: the fruit resembling a black cherry, both in its external and internal structure. It differs from the Portugal sort in having the twigs and petioles green, whereas in that they are reddish brown. The leaves are of a yellowish green, whereas the green on the upper surface is very dark in that; they are also much wider in proportion and elliptical, but in that they are rather lanceolate; they are both toothed about the edge, but this more slightly, and the serratures of this are very harsh to the touch, as if they had prickles at the end: the veins are much more prominent at the back of the leaves in this; in that the leaves are commonly repand along the edge; but in this they are flat, except that the edge is a little bent back. The leaves in both are acuminate but end bluntly, and they generally bend down at the point. The young leaves are inclined to fold together upwards, like those of the Cherry, in this; but in that they are revolute, leaving a wide longitudinal hollow above: the old leaves are generally imperfect at the end, and in this are sometimes retuse or emarginate. The glands, which are obsolete, are placed on each side the midrib, about half an inch above the petiole. It flowers in April, and is a native of the Levant, of Caucasus, &c.

The thirteenth rises with a strong tree-like stem to the height of twenty feet or more, sending out many branches on every side, which have a shining purplish bark: the leaves are on short foot-stalks, of a lucid green, about three inches long, and an inch and half broad in the middle; they are sometimes slightly serrate, but generally entire: the flowers are produced in long bunches from the side of the branches, white, and shaped like those of the twelfth sort: the berries are oval, pulpy, at first green, then red, and when ripe very dark purple; smaller than those of the last sort and narrower at the end; enclosing an oval stone, like that of the Cherry, but more pointed at the top. It flowers in June; and is one of the most beautiful evergreen shrubs, having a fine appearance in long racemes of fine white flowers. It was introduced from Portugal.

Culture in the Plum Kind.—It is obvious that all the varieties were first obtained by seed, or

the stones of the fruit; and the approved kinds acquired in this manner were afterwards multiplied by grafting and budding; as they do not continue the same sorts from seed, for from the seed of one tree many different sorts may be produced, and probably none like the mother-tree, and very few that afford fruit worth eating: but when in possession of any approved sorts, they may be multiplied at pleasure, by ingrafting shoots or buds of them into any kind of Plum-stocks. Of course the mode of increasing these trees is, by grafting, budding, and occasionally by layers; but the two former are the most usual methods of practice.

The two first modes may be performed upon stocks of any sorts of the Plum-kind, which have been raised from the stones, sown in autumn in beds of good earth, about two inches deep; and when the plants are a year old, planted out in nursery rows two feet and a half asunder; when, after having from one to two or three years' growth, they are in a fit state for grafting or budding with the desired sorts; which is performed in the usual way, either low in the stock for dwarfs, or at several feet height for standards. See GRAFTING and INOCULATION.

These trees may be trained either as dwarf wall trees, espaliers, or as standards and half standards.

When the first shoots from the graft or bud are one year old, those of the trees designed as dwarfs for walls, &c. should be headed down within five or six inches of the bottom, particularly the budded trees, in order to force out laterals from the lower eyes, so as to furnish a proper set of branches, proceeding regularly from the bottom of the tree, to cover every part of the wall or espalier. With regard to the standards, their first shoots may either be suffered to run and branch in their own way, or headed to a few eyes, if it seem necessary, to force out lower laterals to give the head a more regular spreading form, afterwards letting them all take their own natural growth.

When the trees raised in either of these modes are from one to two or three years old, they are of a proper size for being finally planted out in the garden, or other place; though trees which are much older may be safely removed; but the younger they are planted where they are to remain, the sooner and more firmly they establish themselves, and form for bearing.

In the layer method, which is only practised occasionally, the business may be performed any time from November till March, choosing the last summer's shoots, and laying them down by *slit-laying*; when in one year they will be rooted, and must then be separated, and planted in nursery rows, being trained either for dwarfs or standards as may be required.

And the Double Blossom, the Striped varieties, and the Stoneless kind, are all increased by budding or grafting upon any kinds of Plum-stocks, either for dwarfs, or half or full standards.

The Bullace kinds are capable of being increased by sowing the berries or stones an inch deep in a bed of common earth in autumn; but to continue the different varieties distinct, they must be increased by budding, grafting, or laying, as in the other sorts.

The proper season for planting all the sorts of these trees is any time, in open weather, from November until March. And trees of all the varieties will mostly succeed in any common soil, and open exposure; but some of the best sorts should always be put for walls and espaliers, those for walls generally having an east or west aspect, or even a south wall for some of the choicest sorts; and a few may also be planted against a north wall, to furnish late fruit: and those for espaliers may be planted round any of the open quarters, as also the standards.

The trees designed for walls and espaliers should be planted out fifteen or eighteen feet distance; though where the walls, &c. are rather low, eighteen or twenty feet distance may be requisite, in order that, in default of a proper height of walling, there may be more scope to train the branches horizontally. But when the trees thus planted are quite young, as only of one year's shoot from the grafting or budding, they should in March be headed down, as above, to four or five eyes, to force out lower horizontals in the ensuing summer; which, according as they advance in length, should be trained horizontally at full length all summer, unless it be necessary to forward a further supply of lower branches as fast as possible; in which case, the young shoots should be pinched off in May down to a few eyes, when each will throw out several lateral branches the same year, which should also be trained horizontally at full length during their summer's growth; and in the winter pruning, cutting out only any foreright and back shoots, training-in all the regular ones at full length; as the branches of these trees should be shortened only occasionally to procure wood to fill vacancies, as the branches always form fruit-spurs first towards their extreme parts, which would be destroyed by shortening: so that, after having shortened the first and second year's shoots occasionally, as above, and thereby procured a proper set of lower horizontals, to give the head its first form; the whole may then be trained in entire about four, five, or six inches asunder; and, accordingly as the trees shoot, every sum-

mer training in a necessary supply of the regular shoots to fill the wall, &c. at the same time retrenching superfluities, and irregular and very rank luxuriant growths, training the supply of regular wood still at full length at the above distances; by which the trees will soon cover a large space, and the same unshortened branches continue bearing many years. See PRUNING.

The necessity of this sort of training is obvious from all the sorts bearing principally upon spurs, half an inch or an inch long, arising from the sides of the branches, of from one or two to many years old, which if shortened would throw out a multiplicity of useless wood, and hardly any fruit-spurs.

All the sorts of wall-and espalier trees of this sort should be pruned twice every year, as in summer and winter, in order to retrench the superfluities of each year, and all foreright and other irregular shoots, and bad wood, and to train in a necessary portion of young wood where wanted to fill vacancies, or to supply the place of decayed, worn-out, and other bad branches. See PRUNING.

The standard-trees should be trained as full standards and half-standards, budding or grafting the former six feet high, and the latter only three or four; both kinds being worked low in the stock, training the first shoots to those heights for stems, then suffering them to branch and form heads: these may be planted out at from twenty to thirty feet distance, letting their heads form naturally.

Mr. Forsyth advises, that in choosing the trees the same directions should be observed as given below for apricots. "Clean straight plants, with single stems, should be employed, as those with two never make handsome trees on walls or standards, and the border should be managed as directed for apricots; digging the holes the same width and depth, and loosening the bottom: then fill up the holes with fine fresh loam, or the mould that was used the preceding year for melon and cucumber beds; being careful to keep the mould a proper height above the border, and the roots of the trees as near the surface as possible, spreading them horizontally. When there are any tap-roots, they should always," he says, "be cut off, as should also the fine hairy roots, as they are liable to get mouldy and rot, and thereby bring on a putrefaction of the mould about the root of the tree. When the roots are not spread near the surface of the ground, it will," he says, "prevent the sun and air from penetrating to them; and the fruit, of course, will not have so fine a flavour." He further advises "that the stems of young plum-trees should never be cut when first planted, but be left till the buds begin to break, when they may be headed down to five or more eyes, always observing to leave an odd one for the leading shoot; always cutting sloping towards the wall, and as near to an eye as possible. Thus managed, the shoots will," he says, "soon fill the wall with fine wood. When it is found that some of the shoots are too luxuriant, they may have the tops pinched off with the finger and thumb, as above, about the beginning of June in the first year after planting; by doing which plenty of wood may be obtained to fill the bottom of the wall." He adds, that "a great deal depends on the first and second year's management of the trees."

With respect to the distance from each other at which Plum-trees should be planted against a wall, "it depends," he says, "on the height of the wall. If the wall be ten feet high, which is the common height, they may be planted at eight yards distance from tree to tree; but if the wall be twelve feet high, or more, seven yards will be sufficient." For his part, he prefers a wall of ten or twelve feet, which will, he thinks, be found high enough, if the branches are trained horizontally; by which means the trees will, he thinks, be much more fruitful, and not grow so luxuriantly. He further adds, that "by training an upright shoot on the Plums, as directed for Pears, fine kind shoots may be gotten from the sides. The leading shoot should be shortened, leaving it from one to two feet long, according to its strength. If the leading shoot be very strong, it may," he thinks, "be topped twice in the summer, as for Pears, and at the same time repeating the same every year till the wall is filled to the top." He would always recommend, where it is convenient, to allot one wall for Plums and another for Cherries, as they always thrive best by themselves, or when distinct.

As there will be Plum-trees to spare, that were planted between Pear-trees, when they begin to meet, these should, he says, be planted against another wall, or as dwarf standards. Those intended for standards should, he says, be prepared in the following manner: The year before they are to be planted they should be cut in the side-shoots at different lengths, from one foot to three, according to the size of the trees; suffering them to grow rude all the summer, neither nailing in nor cutting the side and foreright shoots. And some time during the winter the ground round their roots should be opened, cutting in the strong ones (which will cause them to put forth fine young fibres); then filling in the earth. In the following autumn, or during the winter (the sooner the better), they should be transplanted out as Standards. And in transplanting of the

trees, especially large ones, he considers it to be of great consequence that they be placed in the same position (that is, having the same parts facing the same points of the compass) as formerly. If notice be taken when a tree is cut down, it will, he says, be found that three parts in four of the growth are on the north side. When it is intended to plant them against a wall, they should never be cut in the side-shoots, but only the roots; by this method the trees will, he says, bear fruit the first year after transplanting, and there will be a great saving of time and money. He has often transplanted old Plum-trees that have been headed down that have made very fine roots, which he has divided, and thereby obtained four or five trees from one, cutting them so as to form them into fine heads. "Some that were transplanted in 1798 were in full blossom in 1799, producing some fruit, and in 1800 bearing a full crop."

It is recommended further by the same author, that "the ground in the borders and quarters where fresh trees are to be planted should be well trenched, two spits deep at least, to give the roots room to run into the fresh-stirred ground." And he says that when trees are planted without stirring the mould they seldom thrive well.

He advises that "when Plum-trees are planted for standards in an orchard which is to be kept for grass, they should be in rows at the distance of twenty yards from each other. If in the kitchen-garden for standards, he would always recommend the planting of dwarfs." The tree may be trained up to have a stem of about three feet high, at the distance of seventeen yards. "If the garden is laid out with cross-walks, or foot-paths, about three feet wide, the borders should be made six feet broad, planting the trees in the middle of them. In the royal gardens at Kensington, which are very long and narrow, and where the winds are very hurtful, he has, he says, planted two rows of apple-trees, intermixed with other fruit-trees, alternately, one row on each side of the middle walk (which runs the whole length of the garden), at the distance of seventeen yards from each other. He has also made cross-walks of three feet broad at the distance of seventy yards, with borders on each side six feet wide, having two rows of trees in each border, about twelve or fourteen feet asunder. These dwarf-trees are very useful in breaking the force of high winds, and are at the same time of such a height that a man standing on the ground may gather the fruit. As Plum-trees may be planted in the same manner and for the same purpose as the above, he can have the quarters clear for crops for the kitchen, and a free air be admitted, which can never be had where espaliers are planted: Dwarf Standards can, he says, be kept to what size you please; they look much handsomer than espaliers, and produce a greater quantity of fruit."

In regard to the method of managing and restoring old decayed trees of this sort, he remarks that he has restored "some of them which were so far decayed as to have only from one to two or three inches of bark left; they are now completely filled up with sound wood, with large heads, which at four years' growth filled a wall sixteen feet high, and are at this time full of fine fruit; some of the stems are several inches in circumference, bearing treble the crops produced by young trees that have been planted three times as long as they have been headed down. Where the trunks are become hollow, he always cuts out all the loose rotten parts, and also examines the roots, cutting off what is rotten, injured, or decayed. This method should, he says, be pursued with all hollow and decayed trees; and, if properly executed, they may be so completely filled up, as scarcely to leave a mark behind, even where the wood is totally decayed. He has had shoots from trees of this sort which have been headed, that have grown upwards of seven feet long, and as large as a walking-stick, in one summer: this should never be suffered; but they should be pinched off with the finger and thumb, in the beginning of June, close to an eye or a bud, unless the wall be filled to the top; in which case they should never be cut while they continue to bear handsome fruit. Before they begin to cease from bearing, you must always, he says, begin with shortening every other shoot, leaving them only from six inches to a foot long, and nail them in till the second year, taking care to rub off the superfluous and strong foreright shoots; by that time they will begin to bear: then cut out the others that have done bearing: by this method you will, he thinks, keep the trees in a flourishing state. When the branches are thus managed, they will frequently throw out small dugs, or foreright shoots, about an inch or two long, which will flower next year. They should never, he says, be shortened till after the fruit is set and become about the size of a large pea; by that time the leaves will have covered the fruit, and be able to protect it from the inclemency of the weather. You may now shorten these shoots close to the fruit, which will leave them from one to two inches long. This method he has practised with great success for several years. By leaving these short foreright shoots, the fruit is, he says, protected till it is out of danger of being killed by the

frost, or stunted by the cold north and north-west winds that happen about the latter end of March and beginning of April. The cold chilling rain and snow, which are also very injurious to the fruit, will be thrown off by the branches standing out from the trees. He by no means likes to see great spurs standing out from the wall; for they are always sure to be injured by the frost and cold winds. When the shoots are left naked, he has often seen the plums turn yellow, and drop after they have grown to a considerable size, from their being exposed to the cold frosty winds and rain. They should therefore, he thinks, in cold and frosty weather, be covered in the same manner as Apricots. Plums are, he remarks, more tender than any other sort of stone-fruit, owing to the flower-cup dropping sooner than that of peaches, nectarines, &c. And they are very liable to decay, after cutting off large limbs or branches, which always brings on the gum and canker, if it be left to Nature to perform the cure. He would, therefore, recommend the application of the Composition (in the same manner as directed for other sorts of fruit-trees) to every shoot where the knife touches, as soon as the trees are cut and nailed." And with the intention of having the fruit large and fine, care must be taken to thin it where it is too thick; but that must not be done too soon, lest it should be pinched by the cold. The fruit ought to be of the size of a small marble, and well sheltered by the leaves, before any attempt is made to do this." He advises never to pull off the leaves that shelter the fruit, till it is full-grown and begins to turn. See AMYGDALUS.

In conclusion it is also observed, that "he has taken up several old trees from the walls, when they have grown too near each other, and planted them out as standards, at the same time shortening their branches to form handsome heads, which are now full of fine fruit." These hints and directions are highly deserving of attention, as being the result of much practical experience.

Culture in the Apricot kind.—These trees are increased by budding them upon any kind of Plum-stocks, for which purpose they are raised from the stones of the fruit, sown in autumn in beds of light earth two inches deep; when they will come up the following spring, and in autumn or spring after be fit to plant out in nursery-rows; when in a year or two they will be fit to bud for dwarfs for walls, &c. but for half standards and full standards they must have three, four, or five years' growth, and be trained up with stems from three or four to six feet high; though sometimes the budding for standards is performed low in the stock, and the first shoot trained up for a stem.

The operation of budding should be performed in August, being careful to procure shoots from which to take the buds from trees of the best sorts, performing the operation in the usual way. See INOCULATION.

The buds shoot in the following spring; at which time, before they begin to push, the stock should be headed down a little above the insertion of the bud; soon after which the buds will shoot and advance rapidly, and by autumn form a large shoot, and the trees are then proper for planting out for good, especially the dwarfs intended for wall-trees; or some may remain a year or two longer in the nursery, and be trained in a proper manner for planting against walls; and others for standards. But whether they remain in the nursery, or are planted out into the borders, the first shoot from the bud should in the March following be headed down to four or five eyes, to procure lower horizontal branches, as in the Plum.

When those intended for wall-trees are of one year's growth, with their first shoots or head entire, they are of a proper size for planting out finally where they are to remain. They may be planted out any time in open weather, from October until the beginning of March, choosing a south wall for the early and some other kinds, to come in forward; but as those exposed to the full south sun are apt to become soon mealy, it is proper to plant a principal supply against east and west walls.

Mr. Forsyth however thinks, "the best time for planting Apricots is in autumn, as soon as the leaf begins to fall. The person who goes to the nursery for the plants should, he says, make choice of those which have the strongest and cleanest stems; and if he can procure such as have been headed down, (to use the phrase of the nurserymen) of two or three years' growth, they will bear and fill the walls much sooner than those which have not been so treated. He should make choice of trees with one stem; or, if they have two, one of them should be cut off; for by planting those with two stems the middle of the tree is left naked, and, of course, one third of the wall remains uncovered." And though it is a practice with many to make choice of those with the smallest stems, he thinks they always make weaker shoots than the others.

These trees succeed in any common soil; they are usually planted in a range close along the wall, at eighteen feet distance, with their heads entire, which should be fastened either to the wall or to stout stakes, one to each tree, to pre-

serve them steady until spring, when they must have their first pruning, &c.

Mr. Forsyth however directs that, "if the borders wherein the trees are to be planted be new, they should be made two feet and a half or three feet deep, of good light fresh loam;" and that, "if the trees are to be planted in old borders, where the earth has been injured by the roots of the former trees, it will be necessary to take out the old mould at least three feet deep, and four feet wide, filling up the hole with fresh loam, taking care to plant the trees about eight inches higher than the level of the old border, to allow for the sinking of the earth, that they may not be too deep in the ground."

After being planted, if the trees are only one year old, with their first head from the bud entire, they should be headed down in the spring, to four or five eyes, to force out branches below; after which the trees should have water in dry weather, and the shoots from all the remaining eyes should in summer be nailed up regularly to the wall at their full length; and if any fore-right or back shoots come out, they should be rubbed off, being careful to continue the regular shoots to the wall all summer and the following winter; and in spring each shoot should be shortened to about eight, ten, or twelve inches, according to their strength, leaving the lowermost ones, on each side, rather the longest; this pruning short being still necessary in order to procure a further supply of lower branches, that every part of the wall may be occupied quite from the bottom; having particular attention to preserve nearly an equal number of branches arranging on each side of the tree, nailing them close to the wall horizontally, four, five, or six inches asunder. In the summer following, each horizontal branch will push out three or four, or more, new shoots, of which, if any rise fore-right and behind the branches, they should be rubbed off early in the season, nailing in all the regular side-shoots at full length during the summer, except it is necessary to pinch any particular shoot early to fill a vacancy. In the winter pruning, if there be any superfluities, or irregular growths left in summer, they should be cut out close, and all the regular-placed necessary shoots be shortened, though they should not now be pruned so short as in the two first years, only cutting each shoot according to its strength, from about eight or ten to fifteen or eighteen inches long: as the head of the tree is now tolerably well formed, therefore pruning only so as to obtain a further supply of wood, and a production of fruit; for as these trees bear principally upon the year-old wood, it is proper to train in a general supply of young shoots, of each year, in every part; the same shoots producing at the same time both a crop of fruit and a supply of wood for next year's bearing. The annual supply of wood must always, however, be shortened in the winter pruning; for if left entire it would produce only some shoots near the top, and leave the bottom naked, so as in a few years the whole tree would become very thin of bearing-wood below, and bear only a little towards the extreme parts of the branches. In the winter pruning, the shoots should always be shortened according to the strength of the tree and situation and strength of the respective shoots. And as these trees bear also upon short spurs, arising upon the two-years-old branches, it is proper to preserve them wherever they appear, only retrenching such as project considerably fore-right; leaving all those of one or two inches long, as the young shoots, of one year's growth, are the principal bearers: those produced one year bear fruit the next, and a general supply must be every year retained, and not shortened in summer, which would force out laterals from every eye, and spoil the shoots for next year's bearing; but in the winter pruning, a general shortening is necessary, and the whole tree should then be regularly nailed to the wall.

Mr. Forsyth says that, "when the trees are planted, they should by no means be headed down till the month of April or May, when they begin to throw out fresh shoots: strong trees should be cut a foot from the ground; and those that are weak, about half that length. But in backward seasons, they should not be headed down so early; never until the buds are fairly broken: always observing to cut sloping towards the wall, and as near to an eye as possible, that the young leading shoot may cover the cut; which operation should be again performed in the next March or April: the shoots that are then thrown out must be trained horizontally, to cover the wall: the number of these to be left ought to be from three to six on each side, according to the strength of the main shoot; taking care to rub off with the finger and thumb the fore-right shoots all over the tree, except a few which may be wanted to fill up the wall, near the body of it: and in the second year the horizontal shoots must be shortened in the same manner, according to their growth; and so on every year till the wall shall be completely covered from top to bottom." He adds that "it is a frequent practice with some gardeners, to head down the trees at the time of planting; which often proves fatal to them."

These trees must be pruned twice every year, as in summer and winter.

In the summer pruning, the irregularity of the numerous shoots should be reformed, beginning in May or early in June, and rubbing or cutting off close all fore-right and back shoots, and all superfluities or very rude growths; retaining, however, in every part, a full supply of the regular side-shoots, as succession-wood for the next year's bearing, training them in at full length, as above, to remain till the winter pruning; as it is of importance to leave more than a sufficiency of the well-placed shoots at this season, to have plenty in every part to choose from in the general winter pruning. See PRUNING.

In the winter pruning, a general reform should be made in all the branches and shoots, retrenching all worn-out and old naked branches ill-furnished with bearing-wood; at the same time selecting and retaining, in every part, the best shoots for next summer's bearing, cutting out close all the superfluous or unnecessary and ill-placed shoots, and reducing part of the former year's bearers and unfruitful old branches in every part of the tree, to make due room to train the necessary supply of young wood at proper distances; being careful, in retrenching the old wood occasionally, to prune it down either to a young shoot, or to some convenient branch it supports, which is furnished with one or more such shoots, so as every branch may also terminate in a young shoot for its leader, cutting off all the small shoots arising from the sides of the main ones, and letting the general supply of young wood in every part be now shortened moderately, according to their strength: the smaller shoots may be cut to about eight or ten inches, the middling ones to twelve or fifteen, and the strong shoots to eighteen inches or two feet long, pruning them generally to a wood-bud, in order to obtain a shoot at the end for a leader. All dead wood, cankered parts, decayed spurs, and stumps should be cut out; and as soon as one tree is pruned, let it be directly nailed, which should be performed with great regularity, training all the branches, &c. horizontally, as straight and close to the wall as possible, at equal distances. See PRUNING.

When these trees are of a strong vigorous growth, the shoots should be left thicker or more abundant than in moderate shooting trees, shortening them less in proportion, that by dividing the sap among many and a greater extent of branches, the luxuriancy may be restrained, as the more the strong young wood in a luxuriant tree is pruned, or the shoots shortened, the more vigorous the tree shoots, and produces little fruit. See AMYGDALUS.

The old trees should be well attended to in pruning, to continue them in a good fruitful state, by encouraging young wood in proper abundance; as by this care the trees not only more certainly produce crops, but the fruit generally ripens earlier, and has a peculiar richer vinous flavour. As these old trees are apt to run up naked below in the main branches, care should be taken when young wood advances in these parts, as well as in all vacant spaces, to preserve it so as to continue all the parts of the tree, from bottom upwards, regularly furnished with bearing wood.

In respect to old decayed trees, Mr. Forsyth says, "it has been the general practice to train wall-trees in the form of a fan, which occasions the sap to rise too freely to the top, leaving the lower part almost naked; so that scarcely one quarter of the wall is covered with bearing wood." He says that, "in that case, it will be necessary to cut down the whole of the tree, as near to the place where it was budded as possible, always cutting it at an eye or a joint: if there should be any young shoots on the lower part of the tree, it will be proper to leave them, training them horizontally, which will check the flow of the sap, and thereby render them much more fruitful." He adds that, "very frequently, when large branches have been cut off in a careless manner, and the wounds left to nature, the whole tree is infected with the gum and canker; which, if not checked, will in a short time totally ruin it: the best remedy in this case is, he thinks, carefully to pare off the cankered part of the bark with a draw-knife, or other convenient instrument. You will frequently find the white inner bark infected, which must also be cut away, till no appearance of infection remains; this may be easily known by the brown or black spots, like dots made with a pen, of which not one must be suffered to remain: all the branches so cut and pared should, he says, be immediately covered with the composition in a liquid state." And "as we sometimes see walls with all the trees infected, it will in that case be most prudent to cut every other tree, leaving the rest for a supply of fruit till those which are cut begin to bear; this will be in the second or third year: when trees are in a very bad condition, they should, he thinks, be cut in a partial manner, taking off the worst branches first, particularly those in the middle of the tree, always cutting as near to the graft as possible; or every other branch may at first be taken out, leaving the

rest to bear; by which means there will be a supply of fruit while the other parts of the tree are renovating: it should be remembered, however, that all the cankered bark must be cut off without loss of time; otherwise the new wood will be infected. Old trees thus headed down will, he says, sometimes throw out very strong and vigorous shoots, which it may be necessary to top, as it will cause them to throw out side-shoots, and soon fill up the wall with fine bearing wood; but they should never be suffered to have any fore-right spurs, except little dugs: the topping should be done in the beginning of June, which will cause the tree to produce fine bearing wood for the next year: those trees must be pruned in March following, shortening the shoots from fifteen to six inches, but according to their strength, always leaving the strongest shoots longest. And wherever the knife has been used, the Composition must, he says, be immediately applied."

It is also observed that, "after the fall of the leaf, it will be proper to unnail the young shoots, leaving only a few to prevent the tree from being broken by the wind. By this method they will be more exposed to the sun and air, which will ripen and harden the wood much more speedily than if they be left nailed." He adds that "he has a great dislike to autumnal pruning of fruit-trees, of all kinds of stone-fruit in particular; for by pruning at that season you seldom fail to bring on the canker: and no fruit-trees are more liable to this disease than the Apricot: the reason is obvious,—the great acidity in these trees, the exposure of the wounds, and the dormant state of the sap, predispose to mortification; whereas, in spring, when the sap is beginning to flow, and will follow the knife, the lips will quickly grow: if the branches are small, a fresh bark and fresh wood will in one season completely cover the wound; but if large, a time proportionate to their size will be occupied: this process, however, is manifestly much accelerated by the application of the composition, which excludes the air and wet from the air- and sap-vessels of the tree."

In regard to the standard-trees, they sometimes in favourable seasons bear plentifully, particularly the *Breda* and *Brussels Apricot*, either in half or full standards: the half standards are more out of the power of the winds and cold air.

These should be planted in a sheltered warm situation in the full sun, that they may have the greater chance of setting a good crop of fruit, and of ripening more effectually with a rich flavour: their culture is nearly the same as that of other standard fruit-trees: they require but little pruning, only just to reduce or retrench any very irregular growth or out-growing rambler, or occasionally to regulate confused crowding branches, and to cut out decayed wood; all which should be performed generally in winter.

Covering and protecting the Blossom and young Fruit.—As trees of this kind planted against walls blossom very early, both blossom and young fruit are very liable to be injured by frosts and cutting blasts; it is therefore useful to afford occasional protection, in unfavourable seasons, to some of the forwardest and most valuable kinds, either with mats suspended over the trees, or twigs of evergreens stuck between the branches, beginning the covering as soon as the blossom begins to expand, and continuing it till the fruit is fairly set: the mats to be used only on nights and in bad weather, but the evergreens to remain constantly till all danger is past.

Mr. Forsyth remarks that, "in severe weather, they ought to be covered before the flowers begin to expand; for he has often seen the blossoms drop off before they opened: and he asserts that the best covering is old fish-nets, which should be put on three-fold; and if a few branches of dry fern are stuck in among the branches before the nets are put on, they will assist greatly in breaking the force of the high winds." The common practice of covering with mats in the night, and taking them off in the day, by frequently exposing the trees to the cutting winds, does, he thinks, more harm than good. And the covering with branches of spruce-fir and yew, by being too close, he supposes, encourages a blight, and causes the leaves of the trees to curl, and the shoots to break very weak; whereas the nets admit a free circulation of the air, and at the same time break the force of the wind: when it happens to rain or snow in the fore part of the night, and freeze towards the morning, the drops are, he says, found hanging in icicles on the meshes, while the tree is almost dry: when the shoots become pretty long, and the leaves expand to cover the fruit, it will be necessary, he says, to keep the net clear from the tree, by placing forked sticks, from six inches to a foot long, between it and the wall: this will prevent the shoots and leaves from growing through the net: the forked end of the sticks should rest against the meshes of the net. See AMYGDALUS.

Thinning out the Fruit.—In some seasons these trees set many more fruit than can attain perfection; and as they sometimes are placed very close, or often in clusters, and sit close to

the branches without any yielding footstalks, as in cherries, &c. they, in their advancing growth, must impoverish and thrust one another off; thinning becomes necessary, which in wall-trees particularly should not be omitted, and it is also proper occasionally in standards in some degree. This business should be begun when about the size of large cherries, &c. and should be done with great regularity, leaving the largest, fairest, and best situated to grow to maturity, mostly all singly, or at least never more than two at the same eye, but most commonly single in the large kinds. The fruit thinned off makes excellent tarts, and should always be saved for that purpose, and for which use they may be thinned by degrees, both in wall-trees and standards; but not, in the former, so as to leave the superabundant fruit to grow large in any considerable degree, nor in great quantity, to rob the continuing crop of its proper nourishment: for this use they should always be gathered before they stone, or harden in the heart or middle.

Forcing of Apricots.—In this method the fruit is obtained much more early than in the natural way, and is effected by having the trees in hot-houses, or on hot-walls, or in bark hot-beds.

The proper trees for this purpose are the dwarfs, trained as wall or espalier-trees, but sometimes as small low standards: they are mostly trained in the full ground till advanced to some degree of bearing, and then planted in the borders of the forcing-house and hot-wall, and trained in the manner of wall-trees, to a light open treillis: some also, as small dwarf standards, placed forward in the former, or occasionally in pots, and introduced in the same situation; in all of which, the trees, being well fresh-rooted in their places, are forced at the proper season by means either of fire-heat, or bark-bed, or sometimes both occasionally in forcing-houses, but in hot-walls mostly by the former: the forcing-houses and hot-walls have mostly flues for fire-heat, and sometimes the former have a pit for a bark-bed; but where this is not the case, the whole bottom space is formed of good earth, and the trees planted in are generally in assemblage with peaches, nectarines, plums, &c. as the same degree of heat is suitable to the whole.

The proper season to begin the work of forcing is principally in January, or early in the following month; when, or rather a little time before, the glasses are shut close; and at the proper time the fires made in the furnace moderately every evening and morning, to heat the flues in a proper degree, to afford a moderate regular heat, to warm the internal air to a proper degree, which forwards the trees to early blossoming and fruiting; having fresh air moderately admitted in fine days, and more freely when there is a warm sun; being sometimes watered both in the earth, and over the branches after the blossom is past, and the fruit fairly set. See FORCING-FRAMES, &c.

Culture in the Cherry kind.—These are all increased by grafting, and budding them upon stocks of any of the cherry kind, raised from the stones of the fruit of any of the sorts; but for having larger-growing trees, for standards, walls, and espaliers, the most general stocks used are the Wild Black and Red Cherry, raised from the stones of the fruit: they, however, grow upon any sort of these stocks, and likewise take upon Plums, though these stocks are not proper for general use: they are also capable of growing upon laurel-stocks; which, however, is only practised for curiosity, suffering a small part of the stock to grow up to show the singularity of the two sorts growing upon the same root. All the varieties likewise take upon the Bird-Cherry stocks; but this should only be practised when it is required to dwarf any of them as much as possible; which in this way are proper to train for small dwarf trees, either to plant in pots, or in the open borders, and in pots for forcing, or to plant in the borders of a forcing-frame. See FORCING-FRAMES.

But, for general use, stocks either of any of the Common Cherry varieties; or, to have larger trees, the Wild Cherry-stocks, should be used, as being the freest shooters and of longest duration; though, in raising the stocks, it is from the stones of the fruit, which should be sown in autumn in beds of light earth, covering them near two inches deep: they come up in the spring, and in the autumn or spring following, if the plants are strong, plant them out in nursery-rows two feet and half asunder, to remain for grafting, &c. which, when about the size of a large goose-quill to that of a person's little finger, or little more, they are fit to work for dwarf trees; but for standards, they must have at least four years' growth, as they must be grafted at five or six feet height. And to have trees of more moderate growth either for walls, small standards, or dwarfs, the Morello and small May Cherry stocks may be proper.

The grafting and budding of all the sorts is performed in the usual way, though the former is most proper for general practice, as they are not so liable to gum in the grafted part as in that of the budded trees. Though both methods

may be occasionally used, and may be practised as the stocks occur in proper growth, &c. whip-grafting is the most proper in the most part, in this method of raising them: the budding is performed in the common way: the grafting should be done in the spring, as February and March, and the budding in summer, as June or July: the dwarfs should be grafted or budded near the ground, and the half and full standards from three to six feet high: the grafted trees shoot the same year, and the budded ones the spring following.

When the first shoots from the graft or bud are a year old, those of the dwarf sorts for walls, &c. must be shortened down in March or beginning of April, to five, six, or eight inches long, according to their strength; to procure lateral shoots to form the head, and the standards may be shortened or left entire as the case requires: when wanted to form a spreading head, the first shoots should be shortened to force out lower branches; after this, the branches of the dwarfs and standards remain mostly at their full length; and while the trees continue in the nursery, those designed for walls, &c. should be trained to stakes, in a proper position, occasionally pinching or pruning young shoots of the year early in summer, down to a few eyes or buds where necessary, in order to procure a production of lateral branches the same season, to train in for a further supply of young wood, to increase the expansion of the branches as soon as possible to continue entire.

When the trees have from one or two to five or six years' growth they are proper for being finally planted out; though, if planted when their heads are not more than two or three years old, they succeed much better than larger trees. Mr. Forsyth advises the same attention in choosing these trees, as for apricots, peaches, and nectarines, and that they should be headed down the first year.

The season for planting them out is any time in open weather, from the end of October or beginning of November till March.

The wall and espalier trees should be planted eighteen or twenty feet distant; and where the walls are tolerably high, a half or a full standard may be planted in the spaces between the dwarfs, that while these cover the bottom and middle, the standards may cover the upper part of the wall.

When those planted against walls or espaliers were planted when only one year old from the grafting, &c. with the first shoot from the graft or bud entire, they should be pruned short in March or beginning of April, to furnish lateral branches; but if they were headed in the nursery, and horizontal branches obtained, they must not be shortened afterwards, except occasionally in particular shoots to fill a vacancy: as the fruit-spurs first rise towards the upper end of the branches, a general shortening would not only cut away the first-fruitful parts, but force out a great deal of useless wood. The necessary branches, arising every year after the first heading down, should be trained horizontally at full length, five or six inches asunder; and where wood is wanted some adjacent young shoot may be pinched in May or early in June, or shortened in the spring following, when it will push forth two or three laterals; being careful to retrench all fore-right and other irregular-placed shoots, and continue training the regular branches still at full length at equal distances, till they have filled the proper space of walling or espalier.

In trese trees the bearing-wood does not want renewing annually, the same branches continuing bearing several years, and only want renewing with young wood occasionally, as any branch becomes barren or an ill bearer, except in the Morello, which generally bears the most abundantly in the year-old young wood: a general successional supply of each year's shoots should therefore be retained for successional bearers.

The trees in all the sorts should be pruned twice every year; a summer pruning being given early in the season, to retrench all the superfluous shoots soon after they are produced, likewise all fore-right and other ill-placed shoots, and rank wood, as soon as possible; and to pinch shoots where wood is wanted, so as there may be as little pruning as possible upon the older wood, which is apt to gum by much cutting; retaining, however, a general moderate supply of the regular-placed shoots to choose from in the winter pruning, training the whole at full length: and in the winter pruning, examining the general branches, old and young, both in the former trained bearers, and the retained shoots of the preceding summer, retaining all the fruitful and regular placed former trained branches; and if, among these, any irregularity, disorderly or improper growths occur, the whole should be reformed by proper occasional pruning. In old trees, as well as others, it is proper to retrench any worn-out or declined naked branches, which are destitute of bearing-wood, or fruitful spurs, and to cut out all decayed wood; retaining a plentiful succession of last summer's young wood, in proper places, where necessary, to supply the place of any unserviceable old wood now retrenched; and at the same time cutting out all superfluous, or over-abundant, and other unnecessary shoots reserved last summer, not now wanted, leaving only some well-placed ones, in any vacant spaces, or some in particular parts, to train in between

the main branches, to be advancing for bearers, ready to supply any deficiency; and generally a terminal shoot to the general branches in all parts where the allotted space admits of extending them in proper regularity: accordingly as each tree is thus pruned and regulated, the general branches and shoots should be trained in regularly, and nailed to the wall, &c. about three to four or five inches asunder, all at their full length, to the extent of their limited space.

Mr. Forsyth advises, in pruning these trees, never to shorten their shoots, as most of them produce the fruit at their extremities, the shortening, or cutting off of which very frequently occasions the death of the shoot, at least of a great part of it. The branches, therefore, should be trained at full length. He has often seen the whole tree killed by injudicious pruning. Wherever the knife is applied, it is sure to bring on the gum, and afterwards the canker; which will inevitably kill the tree, he says, if no remedy be applied to the wounds.

The Morello in particular, and the Small Early May Cherry, bear both on the young wood of last summer, the fruit blossom buds issuing immediately from the eyes of the shoots very abundantly, and upon small natural fruit-spurs arising on the two and three years' wood and continuing on the older branches; but generally bear the most plenteously on the young wood; and therefore it is necessary, both in the summer and winter pruning, to attend to this and retain a general supply of the young shoots of each year trained in plentifully in all parts of the tree in summer, of the most regular placed, as many as can be conveniently admitted with proper regularity: and in the winter-pruning, making a general selection of the best well placed shoots of last summer, to train in for successional bearers the ensuing season, cutting out the superabundant, with part of the naked former bearers occasionally to make room for the young supply, leaving a terminal one to each mother branch, and thus train in the general branches and shoots horizontally, about three or four inches asunder, all at their natural length.

The Standard Cherry-trees should be planted twenty-one feet distance at least; but if for a whole orchard, twenty-four feet, or eight yards distant every way, will be requisite. The first shoots having been previously shortened in the nursery, if thought necessary to promote lower branches to form the head, plant them now with their heads entire, except just reducing any irregular growth, and suffer them to branch every way, and shoot in length as fast as they are able, not shortening any, and all the branches will soon form numerous fruit-spurs.

Little pruning is required for Standard Cherries, as too much use of the knife, in the larger wood particularly, causes them to gum and canker; all that is necessary is, occasionally to retrench any very irregular growing branch, and all decayed wood.

In respect to old trees Mr. Forsyth says, "he has headed down a great many Cherry-trees which were almost past bearing, and so eaten up with the gum and canker, that what few Cherries they bore upon old cankered spurs were not fit to be sent to the table;" and that "in the years 1790 and 1791 he cut, or headed down, fifty trees. The operation was performed in the months of April and May in each year. These trees made shoots from three to five feet the same summer, bore fine cherries the next year, and have continued to bear good crops ever since: to the above trees he applied the Composition. At the same time he cut down twelve trees in the same row, but did not apply the Composition; these twelve trees all died in the second and third years after. They now, he says, gather more cherries from one tree where the Composition was applied, than they did from the whole number formerly; being also much finer and larger fruit. When Cherry-trees are very old, and much injured by large limbs having been cut off (which will, he says, infallibly bring on the canker and gum, and, if no remedy be applied, in a short time kill the trees); or if there are great spurs left standing a foot perhaps from the wall; the best way to bring them to have fine heads, and to cover the wall, is to head them down as low as possible, taking care to leave some small shoots, if there are any; if not, leave a bud or two at the ends of some of the shoots. Sometimes you will have a great difficulty to find any buds. If that be the case, in the spring, before you mean to head the trees, make some incisions in the branches. This should be done on different branches, at the most convenient places for filling the wall with good wood. The size of the incisions should be from one to two inches, according to the largeness of the branches; observing to make them just above the joint where the buds should come out. If you cut just below a joint, the shoot will die as far as the next bud or joint; and of course injure the tree, if no remedy be applied." He adds that "the time for performing this operation is in March, April, or May. But this "method of making incisions is only recommended where there are no young shoots or buds, and when the tree is in the last stage of the canker. Where you have a few young shoots, or buds, he advises to cut down the head as near to them as you can, and to take great care to cut out the canker till you come to the sound bark. The canker makes its appearance in these trees in the same

manner as in peaches and nectarines, and may be easily discovered by an attentive observer. "If any gum remains, it must, he says, be cut or scraped off; the best time for doing which is when it is moistened with rain; you can then scrape it off easily without bruising the bark. This operation is very necessary; and if it be neglected the disease will increase rapidly." And wherever the bark or branches have been cut off, the edges should be rounded, and the Composition applied.

It is observed that the general way of pruning these trees has been to leave great spurs, which continue to increase till they stand upwards of a foot from the wall, and become as thick as a man's arm: but it must be observed, that cutting off from year to year the shoots that are produced from the spurs, increases the canker, till large protuberances, like wens, are formed on the branches, becoming very unsightly; and these occasion them to produce only small and ill-flavoured fruit at a great distance from each other. When this is the case, the method he pursues is, to head the trees down as before directed.

And if the young shoots are properly trained, they will, he says, produce fruit the following year; and in the second year produce more and finer fruit than a young tree that has been planted ten or twelve years.

The same writer remarks, that "it has been a general complaint, that Heart Cherries are bad bearers when trained up as wall-trees; but by pruning them as Duke Cherries, he has brought them to bear in the same manner; that is, he leaves a great many fore-right shoots in summer, tucking them in with some small rods run across under the adjoining branches, to keep them close to the wall, and prevent them from being broken by the wind, and from looking unsightly. He advises, "never to make use of the knife in summer, if it be possible to avoid it, as the shoots die from the place where they are cut, leaving ugly dead stubs, which will infallibly bring on the canker. These shoots may be cut in the spring to about a couple of eyes, as Duke Cherries, which will form a number of flower-buds."

Mr. Forsyth well observes, that "as Cherries are a very considerable article of traffic in the London markets, and the markets of most towns throughout the kingdom, employing such a great number of people during the summer season in gathering, carrying to market, and selling them, the raising of them is certainly worth any gentleman's while, especially as the trees may be rendered ornamental as well as profitable, by planting them in shrubberies, &c. Gentlemen of small fortunes, who are at a great expense with their gardens and plantations, may, he says, in a great measure reimburse themselves by selling their cherries and other fruit (for which there will be plenty of chapmen), and thus enjoy at an easy rate the pleasures of a rational and useful recreation." And he adds, that "in all parts of the country, there are persons employed in collecting fruit for the markets, and to hawk it about from place to place; and surely it is much better to sell it to them, than to let it rot on the ground, or be devoured by birds and insects."

It is advised, "when Cherry-trees begin to produce spurs, to cut out every other shoot to make the tree throw out fresh wood: when that comes into a bearing state, which will be in the following year, to cut out the old branches that remain; by that method you will be able to keep the trees in a constant state of bearing, taking the same method as before directed with the foreright shoots. And great care should, he says, be taken to rub off many of them in the month of May, leaving only such a number as you think will fill the tree. By so doing your trees will continue in a fine healthy state, and not be in the least weakened by bearing a plentiful crop of fruit. The reason is obvious: the great exhalation which would be occasioned by the sun and air in the common mode of pruning is prevented, by the Composition keeping in the sap which nourishes the branches and fruit."

He adds, that he "cut some trees, as directed above, more than twelve years ago, that are now in as good a state of bearing as they were in the third year after the operation, and likely to continue so for many years."

He states that "a row of Dwarf Cherry-trees that stood against an old paling, with an old thorn hedge at the back of it, (which every year so infected them with a blight, accompanied by an immense number of caterpillars and other insects, that even in a fine year they could not gather eight baskets from the whole row) became so fruitful after the hedge and paling were removed, that they gathered forty-two pounds a-day for six successive weeks, besides what the birds, wasps, and flies destroyed. He mentions the fact to stimulate market-gardeners and farmers, who have large orchards and gardens, to exert themselves in trying every method, however unimportant it may at first appear, to improve and render them more fruitful, and concludes, that the Duke and Heart Cherries from these trees were as fine as any that were produced from wall-trees. And, as they are much more productive, he has been induced

to take up many old renovated trees from the walls, and plant them out for dwarf standards, supplying their places with pears, plums, peaches, &c." And further he says, that "in all old gardens and orchards throughout the kingdom, and particularly Kent, whence the London markets are chiefly supplied with Cherries, the greater part of the old trees will hardly bear fruit sufficient to pay the expense of gathering it; but if the above method of pruning, &c., were practised, the owner would soon find his account in it, and be amply repaid for his trouble: the fruit would be much finer, and he would have five times the quantity that the trees produce in their present condition; the trees would be more sightly, and always keep in a flourishing and bearing state: but when old standard Cherry-trees become decayed and hollow, he would recommend heading them down, as directed for wall-trees and dwarfs, to scoop out all the rotten, loose, and decayed parts of the trunk, till you come to the solid wood, leaving the surface smooth; then use the Composition."

Forcing of Cherries.—This sort of tree may likewise be forced by artificial heat, in houses, so as to obtain fruit at an early season, as in April and beginning of May. And for this purpose the earliest Dukes and May Cherry are the proper sorts, but principally the former; trained both in standards, of four, five, or six feet stems, to elevate the heads near the top glasses of the forcing-house, which are generally pruned to a small compass for that purpose; and in dwarf standards, with short stems and low heads: both of which, for this use, should be such as are previously trained in the full ground, till the heads are of three, four, or five years' growth, or till they have commenced bearers in some tolerable degree. The forcing-houses for this use are of different constructions, according to circumstances, and the other purposes to which they are applied. They have proper flues for fire heat, and mostly internal borders of good earth, either in the back part for the taller trees, and in the front for lower; or sometimes, where no internal bark-pit is made, for bark-bed heat: the forcing being effected wholly by fire, the whole bottom space is entirely formed into a bed of earth of proper depth, and the trees planted in it in rows from the back to the front, in some regular gradation according to their height; sometimes with dwarfs planted between the taller standards, and towards the front; and occasionally with dwarf trees in pots.

In this sort of forcing, a very slight degree of fire-heat is sufficient; therefore when there are back flues they need not be employed, only that in the front being used.

The author of the Scotch Forcing Gardener observes, that where "the situation is dry, the bottom a kindly sand, gravel, or clay, and the soil a sandy loam to the depth of two feet; the border will require no other preparation than being well enriched with stable dung, and if possible a little marle, which ought to be trenched and well mixed twice or thrice during the summer before planting. But, where it is wet, the bottom a cankering gravel or cold clay, and the soil either a poor sand, gravel, or stubborn clay, care must, he says, be taken to render them otherwise, by paving the border to the breadth of twelve or fourteen feet, running a drain in front to carry off the wet, and removing the bad, and bringing in good soil; so as to compose a rich sandy loam to the depth of thirty inches at the wall, and twenty-four in front, allowing three or four inches for settling. If a new building is erecting for Cherries, it is immaterial, he thinks, whether the building or border is completed first, (providing the latter has a sufficient time allowed for the mixing and incorporation of the soil) as the front wall and flue stand on pillars, whose foundations ought to be at least six inches deeper (if the border is not paved) than the soil."

He considers "about the first of January to be a good time for planting; although a month sooner or later at this season is of little consequence, as there must be no fire-heat applied the first year. Having provided the necessary number of healthy, well-rooted, maiden, or one-year-trained May Dukes; as experience, he says, shows that no other Cherry deserves a place in a forcing-house, let them be planted against the trellis at the distance of eight, nine, or ten feet, according as the length of the house will best divide; filling-in the pits with vegetable mould from decayed tree leaves, and settling all with a little water. Riders, with five or six feet boles, which have been trained two or three years against a wall, and have produced a crop or two, should be provided to fill the upper part of the trellis, where they will yield a few crops before the dwarfs require their removal. These will generally produce a few fruit the first, and be sure to produce a full crop the second year."

The surface of the border should, he says, be forked over once a year, and a little well rotted dung occasionally worked into it.

In respect to the trees, he observes, that "the dwarfs or principals being the only ones intended ultimately to fill the trellis, the riders being planted solely for the purpose of obtaining

a crop or two while those are making their wood and forming their fruit spurs, and, by being checked by their removal, may not be expected to put forth much young wood while they remain there, it will be unnecessary in pruning to thin them out much, only let them be dressed regularly to the trellis, and (where not absolutely requisite) divesting them of any shoots they may make, paying respect to their fruit-spurs only; as when they have served this purpose they will be of no further use."

He says, that "after planting, the dwarfs, if maiden trees, should be headed down to two or three eyes, in order to make them put forth vigorous shoots, to furnish the trellis from the bottom: and, if they have been one year in training, the bottom branches should be laid well down, and the rest dressed in a regular manner to the trellis, using strings of fresh matting to tie with; and be careful to allow sufficient room in the ties, as much mischief is done to fruit, especially Cherry-trees, (which are so apt to gum) if not allowed a sufficiency of room. He makes it a rule to allow every shoot as much room in the shred, or tie, as will at least admit another of the same size along with it."

As these trees are "apt to gum, and the branches decay, from the slightest injury, it would be imprudent to train them horizontally; in which case, the loss of a branch is supplied with much more difficulty than when trained in the fan manner." This last method he therefore recommends. And "when the tree has produced its shoots to the length of five or six inches, they should be gone over and thinned, so as to enable the operator to lay them in at about the distance of ten or twelve inches; pinching off any that are produced fore-right, and which are, from their appearance, not forming for fruit-spurs; and, as they advance, let them be neatly laid in, and divested of any laterals they may produce. If all has gone well, at the end of the first year they will, he says, have produced shoots from twelve to thirty inches long, which should then be shortened to about two-thirds of their length. In the second season they will shoot vigorously, and begin to form many fruit-spurs on the preceding year's wood, which must be encouraged, for the production of a few fruit the following year. The trees should be kept clear of all superfluous and lateral shoots, laying the leading ones at the distance of eight or nine inches; and, at the end of the season, shortening a few of the strongest alternately, so as to make them break their buds in the spring in a regular manner; as they will not require to be any more shortened. And in the third season, they will, he says, produce a few fruit, make fine spurs and moderate shoots; which, as they advance to the riders, room should be given, by lopping off their branches, or thinning away their foliage, so as to afford a free circulation of air and admission of sun. In the fourth season, they will produce a full crop of fruit; and often make such a progress towards the riders, that their presence becomes unnecessary; in which case, it will, he says, be advisable to sacrifice whatever fruit, or appearance thereof, there may be on them, to the encouragement of the principals. After the trees have filled their spaces, and have begun to produce plentiful crops of fruit, they will make little or no wood; and will require no further care, on the score of training, than to supply the place of any branch that from accident may die out or be destroyed."

These trees, from their nature, bear very little artificial (especially fire) heat, on which account he would not advise the forcing of them too early, especially if there be no more than one compartment for their culture; since, in that case, there would not be a continued succession for the supply of the table, and furnishing a dessert, till they came in on the open walls. He considers the first or middle of February to be an eligible time for the commencement of the forcing; but, in a new planted house, the third year ought to arrive before fire heat is applied. Were it not for the sake of other articles that may be placed or planted in the Cherry-house, it would, he thinks, be better that the glasses were not put on the first season at all; but this is generally too great a sacrifice: however, if they are put on, a free circulation of fresh air, even in the night, ought to be encouraged. When in the third year after planting, the trees have made good progress, plenty of fruit-spurs, and a reasonable hope of success is entertained, the glasses should be put on about the middle of January, plenty of air being admitted through the day, shutting them up at night. On the first of February the fire may be lighted, which must, he says, be made so moderate, that, at eight at night, and eight in the morning, Fahrenheit's thermometer may not stand above 40°. In which condition it should be kept as near as possible till about the twentieth of the month; and then increased gradually to 45°: at which point endeavour to keep it till the fruit is fairly set. Afterwards increase the heat to 50°, but not more, till the stoning is over, and the fruit are begun their second swelling. Although, for the sake of the fruit, all danger is then past; yet, if too strong a fire heat is indulged in, it will, he says, have the tendency of

drawing the shoots too weak: and therefore he would not advise that the air of the house, at the fore-mentioned hours, should ever pass 60°.

With regard to the admission of air, he says, "the house ought to be uncovered all the first season after planting: but, if this is not the case; and if, from the nature of what other plants are placed therein, it is imprudent to leave a little air in the house in the night, it should be opened by sun-rise in the morning, having a large and free circulation all day, shutting it up at sun-set. However, when the month of May arrives, it ought, he thinks, to be entirely uncovered. In the second season, he advises, that the glasses be put on by the first of March, large portions of air being admitted, as directed above, and the glasses be removed by the first of August. From the commencement of the forcing, this article must, he says, be more particularly attended to; the first ten days after which, a very large share of air should be given, to prevent the buds from breaking too suddenly, and of consequence too weakly: besides, vegetation (in forcing) ought always to be brought on, as it were, by stealth: the juices flow more kindly; and the plant suffers the first impulse of reviving activity with more patience, than when hurried on in a violent manner. But, after the buds begin to appear turgid, a more moderate quantity may be admitted; still having respect to the temperature of the house, and the prevention of frosty winds from hurting the bloom." At all events, "advantage should be taken of sun-shine; which will allow a larger portion than at other times. Nevertheless, let no day pass (unless a severe frost) wherein less or more air is not admitted; and, in sun-shine, to the extent that the thermometer may not rise more than 10 degrees above the fire-heat medium. After the crop is all gathered, if consistent with the welfare of the other articles contained in the house, the glasses should be removed, and the trees exposed to the weather till the next season.

"When planted, the mould should be settled to the roots of the trees by a moderate watering; and if the house remain uncovered the first season, little attention (except in dry weather) will be required. Due attention should be paid the second year to keep the border in a moderately moist state, that the plants may grow freely; and when their growth is stopt for the season, withhold the water, that the wood may ripen perfectly before they are exposed to the weather. From the time the forcing is begun, plentiful waterings should be given to the border, until the bloom begins to open; and then in a moderate degree till the fruit is fairly set. After which, again increase the quantity till the fruit begins to colour; and then diminish the quantity by degrees till you entirely withhold it, which ought to be done some time previous to the fruit's being ripe." It is also observed, that "washing with the hand-engine should commence with the day the fire is lighted; and, except from the time the bloom begins to appear till the fruit is fairly set, should be repeated thrice a week in the evening, and that with a considerable degree of force, till the fruit begins to ripen. And in the interval of washing, (viz. while in bloom, and till the fruit is set) a little water should be poured on the flue every evening when the fire is at the strongest, which causes a fine agreeable steam to arise in the house, greatly to the benefit of the flowers and foliage. Soft and tempered water should be used at all times, and on all occasions."

With respect to the insects that infest the Cherry House, they are, "the aphis, or green fly; the acarus, or red spider; the caterpillar, and the grub. The first, and least hurtful, is easily destroyed by a fumigation of tobacco. The second, by the process of washing with the engine, which is indispensably necessary to the health and vigour of the trees. Therefore, when they begin to make their appearance at any time, the water, in the ordinary course of washing, should be thrown against the trees with greater force, making a point of beginning at the contrary end of the house each time; whereby, if you happen to miss any part the one way, you may strike it the other. The caterpillar and grub have, he says, given him more trouble than the preceding, or indeed any species of insect whatever; and, after trying a variety of prescriptions, being at much trouble and expense, he can venture to assure the reader, and the public, he has at last discovered a cure", which is as follows:

"Take of soft soap, two pounds; flowers of sulphur, two pounds; leaf, or roll tobacco, one pound; nux vomica, two ounces; and oil of turpentine, a gill: boil them all together in eight gallons of soft or river water to six; and set the liquor aside for use. And any time in winter, at least a considerable time before the trees begin to vegetate, let them be all untied or unnailed the trellis or wall; brush every part of the branches and buds clean with a soft brush, such as is used for painting: make the liquor milk-warm; and, with a sponge, carefully anoint every part of the tree, trellis, &c. Dress the trees neatly to the trellis again; but use none of the old ties or shreds: and let this operation be repeated every winter. The first summer after

anointing, there may, he says, be a few appear, whose eggs have, by being concealed, escaped the action of the liquor, which must be picked off, to prevent their breeding; but, if any, there will be very few, as it is of the most penetrating nature." But this liquor must on no account, he says, be used in summer, as it instantly destroys the foliage. Fruit-trees of all kinds should be anointed with this liquor every year; as it is, he says, equally destructive of every insect and their eggs, which infest them.

In cultivating Dwarf trees, in pots or boxes, it is observed, that "where there is an extensive variety of forcing, and a green-house, or conservatory, Cherries may not only be produced at an early season, but in a long succession, by removing the pots or boxes from one house to another. When there are twenty or thirty trees, they should be divided into four or five equal parts, to make as many successions; and be placed in equal rotation: first, (in November or December) in the green-house, where they may remain till they are fairly set; then, in an early peach- or vine-house, till they begin to colour; and lastly, in the pine or dry stove, to come to maturity. And a very rich compost, such as is used for cucumbers or melons, should be made use of, watering them frequently with the drainings of a dung-dill. They should also be washed or watered frequently over head with a hand squirt or watering pan; and be placed in the most airy situations."

The Double-blossomed sort may likewise be increased by grafting or budding, as in the other varieties, upon any kind of Cherry-stocks, and be trained both as dwarfs, half and full standards, to effect the greater variety in plantations and other places.

And the Wild Cherry is easily raised from seed, as the stones of the fruit; and any variety which affords large and fine fruit may be continued by grafting, &c., in which way it will bear sooner, for which a quantity of stones should be provided in autumn, when the fruit is dead ripe, and be sown in beds of light earth an inch and a half deep, when they will come up in the spring, and after having one or two years' growth may be planted out in nursery-rows, with their tops entire, training them up for standards, with stems six feet high, then letting them branch out above every way, to form heads.

They may be planted out as standards in orchards or any open grounds for the fruit, and in ornamental plantations of forest-trees, where they have a good effect.

The Bird-Cherry sorts may also be increased in the same manner, and likewise by layers, which will readily strike root, and be fit for planting out in one year. They will also grow well by cuttings planted in autumn.

And the last sort is capable of being raised by grafting, and sometimes by layers.

Culture in the Laurel kind.—These are readily increased by seed and cuttings: but as cuttings are the most expeditious mode, they are most commonly raised in that way.

In the first mode, the seeds should be sown in autumn, when ripe, in beds of light earth, near an inch deep, allowing them some protection in severe frosts in winter, either by hooping and matting the bed, or covering it with dry long litter; but suffering them to remain uncovered in mild weather. The plants come up in the spring, giving occasional waterings in dry weather; and in the autumn or spring following, when the season is settled, planting them out in nursery-rows to remain two or three years, or till wanted.

The cuttings should be procured in August or September, in moist weather, from the same year's shoots, cutting them off from about eight or ten to twelve or fifteen inches long, with about an inch of the old wood to the bottom of each, if possible, though this is not indispensably necessary: then strip off the leaves from the lower parts, and plant them in a shady border, in rows, twelve inches asunder, planting each cutting half or two-thirds into the ground, giving water in dry weather, when those planted in August will be rooted the same year; and all in the following summer, shooting at top, perhaps a foot long, by the autumn; at which time, or in the spring after, they may be planted or bedded out in wide nursery-rows, to acquire strength, till wanted. In either of these methods the trees may be trained either bushy or of a shrub-like growth, or trimmed up to a single stem for standards.

These plants delight in a light loamy soil, which is not too moist.

The proper season for planting them out is in the early autumn or spring, according to the soil.

They are highly ornamental in clumps and plantations, in lawns, parks, or out-grounds.

Hedges are sometimes formed of the common laurel for ornament; but where this is practised it should not be trimmed with garden-shears, which mangle and spoil the beauty of the large leaves: all necessary cutting should be performed with a knife, in order to preserve the leaves entire, so as to make a fine appearance.

PSIDIUM, a genus containing plants of the exotic tree kind.

It belongs to the class and order *Icosandria Monogynia*, and ranks in the natural order of *Hesperideæ*.

The characters are: that the calyx is a one-leafed perianth, bell-shaped, five-cleft, permanent: segments ovate: the corolla has five ovate petals, concave, spreading, inserted into the calyx: the stamina have numerous filaments, shorter than the corolla, inserted into the calyx: anthers small: the pistillum is a roundish germ, inferior: style awl-shaped, very long: stigma simple: the pericarpium is an oval berry, very large, crowned with the calyx, one- or many-celled; the seeds numerous, very small, and nestling.

The species cultivated are: 1. *P. pyriferum*, White Guava; 2. *P. pomiferum*, Red Guava.

The first, in its wild state, grows to the height of seven or eight, sometimes of twelve feet, but in the state of cultivation, where the soil is good, it equals a middle-sized apple-tree, the trunk being six feet in height, and a foot and half in circumference: the bark is smoothish, of a yellowish brown colour, with large ash-coloured spots: the wood very hard and tough, used for ox-yokes and the like purposes, and well adapted for fuel: the branches numerous, the young ones four-cornered: the leaves blunt, entire, smoothish, on short petioles, two or three inches long, opposite: the peduncles are solitary, short, supporting a white sweet-smelling flower: the fruit smooth, having a peculiar smell, yellow, sulphureous, or whitish on the outside, roundish or more oblong, the size of a hen's egg or bigger, according to the soil: the rind is a line or two in thickness, brittle and fleshy; pulp rather firm, full of bony seeds, flesh-coloured, sweet, aromatic and pleasant. It is a native both of the West and East Indies.

This fruit is eaten with avidity by the natives, and also sometimes preserved with sugar.

The second species has a pretty thick trunk, twenty feet in height, covered with a smooth bark, and dividing into many angular branches towards the top: the leaves are two inches and a half long, and one inch and a half broad in the middle, rounded at both ends, having a strong midrib and many veins running towards the sides, of a light green colour, opposite on very short foot-stalks: the peduncles are axillary, an inch and a half long: the petals are large and white; the fruit shaped like a pomegranate, crowned, when ripe having an agreeable odour. It is a native of the West and East Indies.

Culture.—These plants are increased by seeds, which must be procured from the countries where they grow naturally; and when these are brought over in the entire fruit, gathered full ripe, they succeed with greater certainty: they should be sown in pots filled with rich kitchen-garden earth, plunging them into a hot-bed of tanners bark, giving them water from time to time, as the earth dries. When the plants come up, they must have free air admitted to them in proportion to the warmth of the season; and, when they have attained strength enough to be removed, be each planted out in a small pot, filled with the same sort of earth, and be plunged into a fresh hot-bed, shading them from the sun until they have taken new root, when they should have a large share of free air admitted to them every day in warm weather, to prevent their drawing up weak; they must also be frequently refreshed with water in summer.

When they have filled these small pots with their roots, they should be shaken out and their roots pared, putting them into larger pots filled with the same sort of earth, and replunged into the hot-bed, where they should remain till autumn, when they must be plunged into the tan-bed in the stove: during the winter they should have moderate warmth, and not too much water, and in summer have plenty of moisture, and in hot weather a great share of air.

They afford ornament among other stove plants.

PSORALEA, a genus comprising plants of the shrubby exotic kind for the greenhouse and stove.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leafed perianthium, dotted with tubercles, five-cleft: segments acute, equal, permanent; the lowest double the length of the others: the corolla papilionaceous, five-petalled: standard roundish, emarginate, rising: wings crescent-shaped, blunt, small: keel two-petalled, crescent-shaped, blunt: the stamina have diadelphous filaments, (one single and bristle-shaped, nine united), ascending: anthers roundish: the pistillum is a linear germ: style awl-shaped, ascending, the length of the stamens: stigma blunt: the pericarpium is a legume the length of the calyx, compressed, ascending, acuminate: the seed single, kidney-form.

The species cultivated are; 1. *P. pinnata*, Winged-leaved Psoralea; 2. *P. aculeata*, Prickly Psoralea; 3. *P. bracteata*, Oval-spiked Psoralea; 4. *P. hirta*, Hairy Psoralea; 5. *P. bituminosa*, Bituminous Psoralea; 6. *P. Americana*, American Psoralea; 7. *P. corylifolia*, Hazel-nut-leaved Psoralea; 8. *P. Dalea*, Annual Psoralea.

The first rises with a soft shrubby stalk, four or five feet high, dividing into several branches:

the leaves are of a deep green colour, composed of three or four pairs of very narrow leaflets, terminated by an odd one, standing upon short footstalks, and coming out without order on every side of the branches: the flowers sit very close to the branches, and are often in clusters: the standard, which is erect and reflexed at the top, is of a fine blue; the wings are pale, and the keel white. It flowers during a great part of the summer, and the seeds ripen in autumn. It grows naturally at the Cape.

The second species is a shrub with angular branches, and lateral solitary flowers without bractes. It is a native of the Cape, flowering in June and July.

The third has a shrubby stem, determinately branched, with round pubescent branches: the leaves sessile: leaflets even, dotted, pointed at the end with a patulous spine: stipules chaffy, lanceolate, acuminate, ciliate: the spikes terminating, solitary, sub-villose, peduncled: the flowers separated by ovate-acuminate ciliate bractes, almost the length of the flowers; the corolla violet-coloured, with a white keel having a violet spot in front. It is a native of the Cape, flowering in June and July.

The fourth species is a shrub, with rough-haired rigid branches: the leaves petioled: leaflets sub-petioled, sub-pubescent: the flowers at the ends of the branches: calyces pubescent: corollas violet-coloured. It is a native of the Cape, continuing in flower most part of the summer.

The fifth has a perennial root, but the stalk not of long duration, seldom lasting more than two years: it rises about two feet high, sending out two or three slender branches: the leaflets about two inches long, and one inch and a quarter broad, on long foot-stalks: the leaves, if handled, emit a strong scent of bitumen: the heads of flowers are on axillary peduncles seven or eight inches long, and blueish, smelling like black currants. It is a native of Italy, Sicily &c., flowering most part of the summer.

The sixth species has diffused, herbaceous stems, with glandular dots scattered over them: the leaflets roundish, very blunt, obsoletely toothed or angular, sprinkled with glandular dots; the middle one larger and petioled: the spikes axillary, oblong, on peduncles the length of the leaves. It is a native of Madeira, flowering late.

The seventh is an annual plant: the stalks rise two feet high, and have at each joint one leaf about two inches long, and an inch and a half broad, having one strong midrib, from which come out several veins, that run towards the top of the leaf: the flowers are produced on long slender axillary peduncles, collected into small round heads, and are of a pale flesh-colour. It grows naturally in India, and flowers in July in this climate.

The eighth species is also an annual plant, with a very branching herbaceous stalk, rising a foot and half high, spreading wide on every side: the leaves are composed of five or six pairs of narrow wedge-shaped leaflets, terminated by an odd one: the flowers are collected in close oblong spikes at the ends of the branches, are small, and of a light blue colour. It is a native of Vera Cruz.

Culture.—These plants are increased by sowing the seeds in the early spring months, on a moderate hot-bed, or in pots, plunging them in it. When the plants have attained three or four inches in growth, they should be planted out into small pots separately, gradually hardening them to the open air, so as to be placed out in it in the beginning of the summer. They are likewise capable of being increased by planting cuttings of the young shoots in the summer months, in pots filled with light earth, plunging them in a moderate hot-bed and covering them close with glasses, watering and shading them well till they have stricken root.

They afford variety among other potted greenhouse plants.

PSEUDO ACACIA. See ROBINIA.

PSEUDO ACORUS. See IRIS.

PSEUDO ASPHODELUS. See ANTHERICUM.

PSEUDO CAPSICUM. See SOLANUM.

PSEUDO DIGITALIS. See DRACOCEPHALUM.

PTELEA, a genus containing a plant of the shrubby kind.

It belongs to the class and order *Tetrandria Monogynia*, or *Dioecia Tetrandria*, and ranks in the natural order of *Terebintaceæ*.

The characters are: that in the male, the calyx is a four-parted perianthium, acute, small, deciduous: the corolla has four petals, oblong, concave, spreading, larger than the calyx, coriaceous: the stamina have four awl-shaped filaments, erect, curved in at the top, flattish and villose at the base, almost the length of the corolla: anthers roundish: the pistillum is an ovate germ, small, abortive: style very short, bifid at the top: stigmas obsolete: female; the calyx and corolla as in the male: the stamina filaments, as in the male, much shorter than the corolla: anthers roundish, barren: the pistillum is an ovate germ, compressed, biggish: style short, compressed: stigmas two, bluntish, diverging: the pericarpium is a roundish drupe, large, juiceless, compressed, membranaceous-winged, two-celled; the seeds solitary, oblong, attenuated upwards.

The species is *P. trifoliata*, Three-leaved Ptelea, or Shrubby Trefoil.

It rises with an upright woody stem ten or twelve feet high, dividing upwards into many branches, covered with a smooth grayish bark, garnished with trifoliate leaves standing upon long foot-stalks: the leaflets are ovate or ovate-lanceolate, smooth, and of a bright green on their upper side, but pale on their under; these come out late in the spring, soon after which the bunches of flower-buds appear, which is generally in the beginning of June, the leaves being then but small, and afterwards increase in size, but are not fully grown till the flowers decay: the flowers are produced in large bunches at the end of the branches; are of an herbaceous white colour, composed of four or five short petals, ending in acute points; fastened at their base to a short calyx, cut into four segments almost to the bottom. It grows naturally in North America.

There is a variety with five leaves.

Culture.—This plant may be increased by seeds, cuttings and layers.

The seeds should be sown in the early spring months, as March, in pots filled with light rich mould, plunging them in a moderate hot-bed to bring up the plants, giving them occasional waterings during the summer season, and protecting them during the winter from severe frost, planting them out in the following spring in nursery-rows, to get strong for being finally planted out.

The cuttings should be made from the young shoots, and planted in pots filled with light earth in March, plunging them in a hot-bed to strike them, but they should not have much heat, due shade being given. They readily strike root, and may be planted out in the following autumn.

The layers may be laid down in the autumn, choosing the young shoots for the purpose, giving them a slit underneath, and then placing them in the soil. They are mostly rooted in the course of a twelvemonth.

These plants are proper for shrubberies and other places in pleasure-grounds, where they have a very ornamental effect.

PUDDING-GRASS. See MENTHA PULEGIUM.

PULMONARIA, a genus furnishing plants of the hardy perennial fibrous-rooted kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Asperifoliæ*.

The characters are: that the calyx is a one-leafed perianthium, five-toothed, prismatic-pentagonal, permanent: the corolla one-petalled, funnel-form: tube cylindrical, the length of the calyx: border half-five-cleft, blunt, from upright-spreading: throat pervious: the stamina have five filaments, in the throat, very short: anthers erect, converging: the pistillum has four germs: style filiform, shorter than the calyx: stigma blunt, emarginate: there is no pericarpium: calyx unchanged, fostering the seeds at bottom: the seeds four, roundish, blunt.

The species cultivated are: 1. *P. officinalis*, Common Lungwort; 2. *P. angustifolia*, Narrow-leaved Lungwort; 3. *P. Virginica*, Virginian Lungwort.

The first has a perennial fibrous root: the lower leaves rough, about six inches long, and two inches and a half broad, of a dark green on their upper side, marked with many broad whitish spots, but pale and unspotted on their under side: the stalks almost a foot high, having several smaller leaves on them standing alternately: the flowers are produced in small bunches at the top of the stalks, of different colours. It is a native of Europe, flowering from March to May.

The second species has leaves much narrower than those of the first sort, and covered with soft hairs, not spotted: the stalks rise a foot high, and have narrow leaves on them, of the same shape with those below, but smaller, and almost embracing: the flowers are produced in bunches on the top of the stalks, of a beautiful blue colour. It is a native of Sweden.

It varies with white flowers.

The third has a perennial, thick, fleshy root, sending out many small fibres: the stalks a foot and half high, dividing at the top into several short branches: the leaves near the root four or five inches long, two inches and a half broad, smooth, of a light green, on short footstalks; those upon the stem diminish in their size upwards, are of the same shape, and sessile. Every small branch at the top of the stalk is terminated by a cluster of flowers, each standing upon a separate short peduncle. The most common colour of these flowers is blue; but there are some purple, others red, and some white. They appear in April, and if they have a shady situation continue in beauty great part of May. It grows upon mountains in most parts of North America.

Culture.—These plants are increased by seeds, and parting the roots.

The seeds should be sown in the spring, in a bed or border of common earth, raking them in. They soon come up, and in the latter end of the summer they should be put out, either where they are to remain, or in nursery-beds, till October, when they should be planted out finally.

The roots should be parted in the autumn, as about August or September, but the sooner

after they have done flowering, the better. They should not be divided too small, and be planted directly; when they flower strong in the following spring. They afford ornament in shady situations.

PUMPION or PUMPKIN. See CUCURBITA.

PUNICA, a genus containing plants of the tree and shrub kinds.

It belongs to the class and order *Icosandria Monogynia*, and ranks in the natural order of *Pomaceæ*.

The characters are: that the calyx is a one-leafed, bell-shaped, five-cleft perianthium, acute, coloured, permanent: the corolla has five roundish petals, from upright spreading, inserted into the calyx: the stamina have numerous capillary filaments, shorter than the calyx, and inserted into it: anthers somewhat oblong: the pistillum is an inferior germ: style simple, the length of the stamens: stigma headed: the pericarpium is a sub-globular pome, large, crowned with the calyx, divided into two chambers by a transverse partition, the upper having about nine, the lower about three cells: partitions membranaceous: the seeds very many, angular, succulent: receptacle fleshy, scrobicular, dividing each cell of the pericarp two ways.

The species are: 1. *P. granatum*, Common Pomegranate Tree; 2. *P. nana*, Dwarf Pomegranate Tree.

The first is a tree which rises with a woody stem eighteen or twenty feet high, sending out branches the whole length, which likewise put out many slender twigs, rendering it very thick and bushy, some of which are armed with sharp thorns: the leaves are narrow spear-shaped, about three inches long, and half an inch broad in the middle, drawing to a point at each end; are of a light lucid green, and stand opposite: the flowers come out at the ends of the branches, singly or three and four together; frequently one of the largest terminates the branch, and immediately under that are two or three smaller buds, which continue a succession of flowers for some months. The fruit is a pome berry, covered with a hard coriaceous rind including a pulp. It is a native of Spain, Portugal, &c. In the West Indies, where it is supposed to have been introduced from Europe, the fruit is larger and better flavoured.

There are several varieties: as the Large Double-flowered, and the Striped-flowered.

The second species seldom rises more than five or six feet high: the flowers are much smaller than those of the common sort; the leaves are shorter and narrower; the fruit is not larger than a nutmeg, and has little flavour: but it may be kept within compass; and in the West Indies, where it is a native, and is planted for hedges, it continues flowering great part of the year.

Culture.—The first sort and varieties are readily increased by layers; which should be laid in autumn, choosing the young branches for the purpose, giving a little slit underneath at a bud, and laying them in the usual way, giving occasional waterings in summer; and by the following autumn they will be well rooted, and fit to be planted in nursery-rows for two or three years, to get strength, and then planted where they are to remain.

Those of the common sort and varieties may be trained as half or full standards, or as dwarfs; but those designed for walls should be managed as directed for peaches, &c.

This sort may be planted against warm walls, and be pruned and trained as other fruit-trees.

Of this sort, the double-flowering kind is much more esteemed than the other in this country for the sake of its large, fine, double flowers, which are of a most beautiful scarlet colour; and, if the trees are supplied with due nourishment, continue to produce flowers for two months successively; which renders it one of the most valuable flowering trees. This sort may be rendered more productive of flowers by grafting it upon stocks of the single kind, which check the luxuriancy of the trees, and cause them to produce flowers upon almost every shoot.

The second sort may be raised also by layers, as the former, but must be planted in pots filled with rich earth, and preserved in a greenhouse. In the summer, when the flowers begin to appear, if the plants are exposed to the open air, the buds will fall off without opening; they should therefore be placed in an airy glass case, and a large share of air should be given them every day in warm weather. By this treatment the plants may be continued in flower upwards of three months, and make a fine appearance.

These are very ornamental trees for shrubberies and other places.

PURGING NUT. See IATROPHA.

PURPLE APPLE. See ANNONA.

PURSLANE. See PORTULACA.

PURSLANE TREE. See PORTULACARIA.

PYRUS, a genus containing plants of the fruit-tree kind.

It belongs to the class and order *Icosandria Pentagynia*, and ranks in the natural order of *Pomaceæ*.

The characters are: that the calyx is a one-leafed perianth, concave, five-cleft, permanent: segments spreading: the corolla has five petals, roundish, concave, large, inserted into the calyx: the stamina have twenty filaments, awl-shaped, shorter than the corolla, inserted into the calyx:

anthers simple: the pistillum is an inferior germ: styles five, filiform, the length of the stamens: stigmas simple: the pericarpium is a roundish pome, umbilicate, fleshy, with five membranaceous cells: the seeds some, oblong, blunt, acuminate at the base, convex on one side, flat on the other.

The species are: 1. *P. communis*, Common Pear-tree; 2. *P. Malus*, Common Apple-tree; 3. *P. spectabilis*, Chinese Apple-tree; 4. *P. prunifolia*, Siberian Crab-tree; 5. *P. coronaria*, Sweet-scented Crab-tree; 6. *P. Cydonia*, the Quince-tree.

The first grows to a lofty tree, with upright branches, the twigs or branchlets hanging down: the leaves are elliptical, obtuse, serrate; the younger ones clothed with a deciduous cotton underneath and along the edge: the stipules linear: the flowers in terminating villose corymbs of a snow white colour: the fruit is a pome. It is a native of Europe.

It is observed that "the Wild Pear, the mother of all the orchard and garden varieties, is thorny. The stipules are setaceous, white (or reddish), deciduous: the peduncles alternate; and the calyx clothed with a ferruginous wool."

There are numerous varieties; but those of most importance for cultivation are:

The Little Musk, which is often termed the Supreme. The fruit, when ripe, is of a yellow colour; the juice somewhat musky; and, when gathered before it be too ripe, is a good fruit. It becomes ripe about the latter end of July, but continues good only a very short time.

The Chio, or Little Bastard Musk, which is pretty much like the other, but smaller. The skin, when ripe, has a few streaks of red on the sun side.

The Green Chissel, or Hastings, which is a middle-sized fruit, that always remains green, and is full of juice when ripe. It becomes ripe in the beginning of August.

The Red Muscadelle, which is a large early pear, of great beauty; the skin is of a beautiful yellow striped with red, and the flesh has a rich flavour. It sometimes produces two crops in a year; the first about the end of July, and the second in September, or thereabouts.

The Little Muscat, which is a small pear, having the skin very thin, and of a yellowish colour when ripe. This fruit has a rich musky flavour, but does not keep long. It becomes ripe about the beginning of August.

The Lady's Thigh, which is here commonly called Jargonelle, is of a russet green colour from the sun, but towards it inclining to an iron colour; the flesh is breaking, and has a rich musky flavour. It becomes ripe about the middle of August.

The Windsor, which has a smooth skin, and when ripe is of a yellowish-green colour; the flesh is very soft, and, if permitted to hang but two or three days after it is ripe, grows mealy and is good for nothing. It becomes ripe about the latter end of August.

The Jargonelle, which is commonly called Cuisse Madame. According to Mr. Forsyth it is certainly the true French Jargonelle; and the pear which commonly goes by that name here is the real Cuisse Madame, or Lady's Thigh; it being very probable that the names have been changed in coming to this country. This pear is somewhat like the Windsor; the skin is smooth, and of a pale green colour. It is a plentiful bearer; but the flesh is apt to be mealy if it stands to be ripe, which is about the middle of August. It bears best on standards.

The Orange Musk, which is of a yellow colour spotted with black; the flesh is musky, but very apt to be dry. It ripens about the latter end of August.

The Great Blanquet, or Bagpipe of Anjou, which has a smooth skin of a pale-green colour; the flesh is soft, and full of juice of a rich flavour. It ripens about the middle of August.

The Little Blanquet, which is much less than the former; of a pale colour, and the flesh tender and full of a rich musky juice. It ripens about the latter end of August.

The Long-stalked Blanquet has a very smooth skin, white, and a little coloured towards the sun, and is full of a rich sugary juice. It becomes ripe at the latter end of August.

The Skinless or Early Russelet, which is of a reddish colour, the skin extremely thin, and the flesh melting and full of a rich sugary juice. It ripens in the latter end of August.

The Musk Robine, or Queen's Pear (also called the Amber Pear), which is small, and of a yellow colour when ripe; it has a rich musky flavour, and is a great bearer. It ripens about the latter end of August.

The Musk Drone, which has a skin of a yellow colour when ripe, and a rich musky taste; but is apt to grow mealy if left too long on the tree. It ripens about the beginning of September.

The Red Orange, which is of a greenish colour; but the side next the sun changes to a purple colour when ripe; the flesh is melting, and the juice sugary, with a little perfume. It ripens in the beginning of August.

The Cassolette, or Green Muscat, is a small greenish pear with some specks in the skin. It is full of a rich perfumed juice, and ripens in the latter end of September.

The Great Onion, Brown Admired, or King of Summer, which is of a brownish colour next

the sun, and becomes ripe in the beginning of September.

The Musk Orange, in which the skin is green, and the flesh melting. It ripens in the beginning of September.

The Avorat, or August Muscat, which has a smooth skin of a whitish yellow colour; the juice is richly sugared and perfumed, and it is esteemed one of the best Summer Pears yet known. It is a great bearer, and becomes ripe in the beginning of September.

The Rose, or Thorny Rose, which is shaped like the Great Onion Pear, but much larger, of a yellowish-green colour, but a little inclining to red next the sun. The flesh is breaking, and the juice musky. It becomes ripe in the beginning of September.

The Poire du Puchet, which has the flesh soft and tender, and the juice sugary. It ripens in the beginning of September.

The Perfumed Pear, which is of a deep red colour spotted with brown; the flesh melting, but dry, and has a perfumed flavour. It ripens in the beginning of September.

The Salviati, which is red and yellow next the sun, but whitish on the other side; the flesh is tender, and the juice sugary and perfumed. It ripens about the middle of September.

The Rose Water, which has the skin rough, and of a brown colour, the juice very sweet, tasting like rose-water. It ripens in the latter end of September.

The Russelet, in which the flesh is soft and tender, and the juice agreeably perfumed. It ripens in the latter end of September.

The Great Mouthwater, which has the flesh melting and full of juice. It ripens about the latter end of September.

The Prince's Pear, which has a highly-flavoured juice, and is a great bearer, ripening about the latter end of September.

The Summer Bergamot, which is sometimes called Hamden's Bergamot. The flesh is melting, and the juice highly perfumed. It ripens about the latter end of September.

The Autumn Bergamot, which is smaller than the former; the flesh is melting, and the juice highly perfumed. It is a great bearer, and ripens in the beginning of October.

The Summer Bonchrêtien, which is very full of juice, and is of a rich perfumed flavour. It ripens about the middle of September.

The Beurré Rouge, (the Red Butter Pear,) which has the flesh very melting and full of a rich sugary juice. It ripens in the beginning of October, and, when first gathered from the tree, is one of the very best sort of pears.

The Dean's Pear, which has the flesh melting and full of juice, which is very cold. It is a great bearer, and ripens in the beginning of October.

The Swiss Bergamot has a melting flesh, and is full of juice. It ripens in the beginning of October.

The Long Green, in which the flesh is melting and full of juice. It ripens in the latter end of October. It is, by some, reckoned the same with the Mouthwater.

The White and Gray Monsieur John, which are the same; the difference of their colour proceeding from the different soils and situations wherein they grow, or the stocks on which they are grafted. If this pear be rightly managed, there are not many sorts in the same season to be compared with it. The flesh is breaking, and full of a rich sugared juice. It ripens in the latter end of October, or beginning of November.

The Flowered Muscat, which is an excellent pear; the flesh is very tender, and of a delicate flavour. It ripens in November.

The Vine Pear, which is of a dark red colour; the flesh very melting, and full of a clammy juice. It comes into eating in November.

The Rousseline Pear, which is of a deep red colour, with spots of gray; the flesh is very tender and delicate, and the juice very sweet, with an agreeable perfume. It ripens about the latter end of October, but does not keep.

The Knave's Pear, which has the flesh fine and tender, and the juice very much sugared. It ripens in the latter end of October.

The Marquis Pear is a pear which, when it does not change yellow in ripening, is seldom good; but if it does, the flesh will be tender, delicate, and very full of juice, which is sugared. It comes into eating in November.

The Crasane Pear, which has the flesh extremely tender and buttery, and full of a rich sugared juice. It is the very best pear of the season, and comes into eating about the latter end of December.

The Lansac, or Dauphine Pear, which has the flesh yellow, tender, and melting; the juice is sugared, and a little perfumed. It is in eating the beginning of December.

The Martin Sec (the Dry Martin), which is almost like the Russelet in shape and colour; the flesh is breaking and fine; and the juice sugared, with a little perfume. It is in eating about the beginning of December.

The Amadot, which is rather dry, but high-flavoured: it is in eating about the middle of December.

The Little Lard Pear, which is extremely fine; the flesh melting; the juice much sugared, and has an agreeable musky flavour. It is in eating the latter end of December, and is esteemed one of the best fruits in that season.

The Louisbon (the Good Lewis), which has the flesh extremely tender, and full of a very sweet juice. It is in eating about the middle of December.

The Colmar Pear, which is very tender, and the juice greatly sugared. It is in eating about the beginning of January, and is esteemed an excellent fruit.

The L'Eschasserie, which has the flesh melting and buttery; the juice is sugary, with a little perfume. It is in eating about the first of January. It bears best on standards.

The Virgouleuse Pear, which is esteemed by some as one of the best fruits of the season; the flesh is melting, and full of a rich juice. It is in eating about the first of January. In dry and cold seasons it is very apt to crack, which greatly diminishes its value.

The Ambrette, which is esteemed a very good pear; the flesh is quite melting, and full of sweet perfumed juice. It comes into eating about the beginning of January.

The Epine d'Hyver (the Winter Thorn Pear), which has a very tender buttery pulp, of an agreeable taste, with a sweet juice highly perfumed. It is in eating about the latter end of December.

The St. Germain Pear, which is a fine fruit and keeps long; the flesh is melting, and very full of juice, which in a dry season, or if planted on a warm dry soil, is very sweet. It is in eating from December till February. Mr. Forsyth remarks, that it is "an excellent bearer, when planted as a dwarf standard, and comes in succession after the same sort of pears on wall-trees are over."

The St. Austin, which is pretty full of juice, and which is often a little sharp; the flesh is tender, but not buttery. It is in eating the latter end of December, and continues good two months, or longer.

The Spanish Bonchrêtien, which is a large fine pear; the flesh is breaking, and the juice sweet. It is in eating in January.

The Wilding of Cassoy, which is also called the Small Winter Butter Pear, is a small fruit; the flesh is melting, and the juice very rich: it is an excellent bearer on standards. It is in eating in January.

The Martin Sire, or the Lord Martin, which is a good fruit; the flesh is breaking and full of juice, which is very sweet and a little perfumed. It is in eating in January.

The Winter Russelet, which has the flesh buttery and melting, and generally full of a sweet juice. It is in eating in the latter end of January.

The Franc Real, or the Golden End of Winter, which is only esteemed for baking.

The Brown Beurré, which is of a reddish-brown colour on the side next the sun, and yellowish on the other side. The flesh is melting, and full of a rich juice. It ripens in October, and is esteemed an excellent pear.

The Holland Bergamot, Amoselle, or Lord Cheney's, which is a very good pear; the flesh is half buttery and tender, and the juice is highly flavoured. It keeps from the end of January till April.

The German Muscat, which is an excellent pear; it is buttery and tender, and the juice is highly flavoured. It is in eating from February till April or May.

The Pear of Naples, or Easter St. Germain, which is half-breaking; the juice is sweet, and a little vinous. It is in eating in March.

The Winter Bonchrêtien, which is very large; the flesh is tender and breaking, and is very full of a rich sugared juice. It is in eating from the end of March till June.

The La Pastorelle, which is tender and buttery, and the juice sweet. It is in eating in March.

The St. Martial, or the Angelic Pear, which has the flesh tender and buttery, and the juice very sweet. It is in eating in March.

The Wilding of Chaumontelle, which is melting, the juice very rich, and a little perfumed. It is in eating in January.

The Brown St. Germain, which is a very fine high-flavoured pear on dwarfs and standards, and comes in after the Wall St. Germain. It continues in eating from December to the end of March.

The Pear d'Auch, which was introduced by the late Duke of Northumberland. It much resembles the Colmar, but is fuller towards the stalk. It is in eating from Christmas to April, and is, without exception, the best of all the Winter Pears.

The Swan's Egg, which is a middle-sized pear, in shape like an egg; it is of a green colour, thinly covered with brown; the flesh is melting, and full of a pleasant musky juice. It comes in eating in November. It is healthy, and bears well either as a standard or in any other way.

The Bergamot de Pasque, which has also the following names:—the Terling, the Amoselle, the Paddington, and the Tarquin. It is a fine handsome fruit, green when gathered, and of a yellowish or straw colour when ripe. It comes into eating about the month of April, continues till June, and makes a very handsome appearance at table.

The Golden Beurré, which is a very fine pear; it is of a beautiful scarlet colour next the sun, and of a gold colour on the other side. The

flesh is melting, and the juice high-flavoured. It ripens in October. It succeeds best on an east aspect, and a loamy soil. It is a plentiful bearer. Mr. Forsyth observes, that it "was introduced from Burgundy by the late Marshal Conway, and was first raised, in this country, at his seat of Park Place, near Henley-upon-Thames, now the seat of Lord Malmesbury."

The Williams's Seedling Pear, which resembles a Summer Bonchrêtien, but is more juicy, is a great bearer, and ripens in September. Mr. Forsyth says that it "will be a valuable acquisition to the market-gardeners, as it immediately succeeds the Windsor Pear."

The Citron de Carmes, which is a middle-sized pear, of a yellowish-green cast, full at the eye; of a round shape, but tapering a little toward the stalk, which is long. It becomes ripe in July.

And the True Golden Beurré, which in shape and size resembles the Brown Beurré; but is of a reddish-brown colour next the sun. It is a very fine pear, but does not keep long. It comes into eating in October.

Mr. Forsyth gives the following selection from Anderson's and Co.'s Catalogue, of Edinburgh:

Of the Summer Kinds—The Pear James, which is soon ripe, and soon rotten, has a little flavour, and is the earliest pear in Scotland.

The Early Carnock, which is indifferent, of a yellow colour, and bright red towards the sun; making a beautiful standard tree.

The Lemon, Lady's Lemon, or Lady Lamont, which is indifferently good, but principally valued for coming early, and being a good bearer in common.

The Green Pear of Pinkey, which is a small green pear, nearly round, of a sweetish taste or flavour.

The Forrow Cow, a Clydesdale pear, which is a large pear with a short stalk; flat towards the eye; the colour red and yellow; the flesh tender, and musked in its flavour.

The Pear Sauch, a Clydesdale pear, which is a big-bellied beautiful pear; the tree large, a great bearer, and fit for an orchard; but the fruit is not very good.

The Gray Honey, which is a pretty good pear.

The Green Orange Pear, or Orange Vert, which is a very good pear.

The Brute Bone, Chaw Good, or the Pope's Pear, which is only an indifferent sort.

The Golden Knap, supposed Scotch, which is a small Summer Pear, of tolerably good qualities.

The Early Achan, an indifferent fruit; greatly inferior to the Winter Pear of that name.

The Hanging Leaf, which is the name in Clydesdale, is good and beautiful; almost round; its colour red and yellow: a delicious sweetness is found in its taste.

The Scots Bergamot, which is a large good pear, of a yellow and red colour; the flesh tender and juicy.

The Longueville, which is very good, but a precarious bearer; supposed French, though not in their catalogues under that name.

The Musked Bonchrêtien, Gratioli, Cucumber, or Spinola's Pear, which is a very good pear when grafted on a free stock; its pulp being somewhat between short and tender, with a great deal of perfumed juice; its colour red on one side, and white on the other.

And the Saffron Pear, which is a pretty large well-shaped pear, fit for the orchard or the field.

Of the Autumnal Kinds—The Keather, which is a Clydesdale pear, of middling size, and oblong shape, its juice agreeable.

The French Carnock, which is tolerably good.

The Elshin Haft, or Good-Man Pear, which is a long pear, flat towards the eye; its colour green and yellow; its flesh hard, dry, and sweet in the taste.

The Drummond, or Late Scotch Carnock, which is very good, if eaten before it grows mealy; its colour a bright red and yellow.

The Vicar, an oblong pear, with the colour yellow, red and striped; tender, sweet, and musked, but dry in eating.

The Royal Orange Bergamot, which differs from the Orange Bergamot in being yellower, and sometimes having a faint red on one side.

The Green Pear of Yair, which is sweet, juicy, and melting; of a moderate size; taking its name from Yair, on Tweed-side, where it was first discovered.

The Rob Hind, which is very indifferent.

The Le Besideri, the Wilding of the forest of Ileri in Bretagne, which is a yellowish pear, of middle size, but which is indifferent.

The Unicorn Pear, which is of a beautiful red and yellow colour; but rather austere in the taste or flavour.

Of the Winter Kinds—The Winter Achan, which is a Scotch Pear; among the best early Winter Pears, and equal to most of those of the French kind.

The Brier Bush, which is Scotch; a good pear, and will ripen in most seasons; it is a small pear, of a firm substance, and sweet taste.

The Brompton Park, which is a seedling sent by Jefferys of that name.

The Round Winter, which is a Clydesdale pear; a very excellent Winter Pear.

The Poir Portrail, or Gate Pear, which is proper for baking.

The La Double Fleur, or the Double-flowering Pear, which is a large flat beautiful pear, with a smooth skin, and blush colour on one side, and yellow on the other: it is the best to preserve, taking a beautiful red colour from the fire.

And to these the following list is added:—The Ambrosia Pear, the Ashton Town, the Autumn Musk Bonchrêtien, the Bishop's Thumb, the Bloody Pear proper for baking, the Brocas Bergamot, the Barland proper for perry, the Besideri fit for baking, the Beurré du Roi, the Black Pear of Worcester fit for baking, the Britannia, the Burdelieu, the Doyenne or St. Michael, the Catillac fit for baking, the Easter St. Germain, the Gansel's Bergamot, the Golden Beurré, the Gray Beurré, the Gray Goodwife, the Green Sugar, the Green Bergamot, the Huntingdon Pear, the Huffcap proper for perry, the King's Catharine, the Lammas, the London Sugar, the Muscat Almain, the Musk Blanquet, the Oldfield proper for perry, the Orange Bergamot, the Pear Piper, the Pyrus Pollveria, the Red Admirable, the Rough Cap proper for perry, the Scotch Bergamot, the Seven-angled, the Silver-striped, the Spanish Red Warden best for baking, the Squash proper for perry, the Striped Verte Longue, and the White Beurré.

And for small gardens, where there is room only for a few trees, the following are recommended as proper for furnishing a regular succession of fruit:

Summer Kinds—The Musk Pear, the Green Chissel, the Jargonelle, the Summer Bergamot, and the Summer Bonchrêtien.

Of the Autumn Kinds—The Orange Bergamot, the Autumn Bergamot, the Gansel's Bergamot, the Brown Beurré, the Doyenne or St. Michael, and the Swan's Egg.

Of the Winter Kinds—The Crasane, the Chaumontelle, the St. Germain, the Colmar, the D'Auch, the L'Eschasserie, the Winter Bonchrêtien, and the Bergamot de Pasque.

The second species is a spreading tree, with the branches and twigs irregular and twisting, more horizontal than in the first: the leaves ovate, serrate, the younger ones pubescent underneath: the stipules linear; the flowers in terminating, sessile, villose umbels, white, finely tinged with red on the outside: the fruit roundish, umbilicate at the base, and acid. It is a native of Europe.

In its wild state it is called the Crab or Wilding, and is armed with thorns, as well as the Wild Pear. Miller mentions two varieties in the fruit of the Crab, one white, the other purple towards the sun; but it is commonly yellowish green with a tinge of red. And also a variety with variegated leaves.

There are a great many varieties of the Apple, but the following are given by Mr. Forsyth as the most deserving of attention:

The Acklam's Russet, which is a small Yorkshire apple, of a russet colour toward the sun, and yellow on the other side; it becomes ripe in January, and keeps till March.

The Aromatic Pippin, which is a very good apple, of a bright russet next the sun; and the flesh has a fine aromatic flavour. It ripens in October.

The Baxter's Pearmain, which is a real Norfolk apple, of a handsome size, and pale-green colour, full of small dark spots. It is a fine kitchen fruit, and will keep till April. It is also a good eating apple.

The Beauty of Kent, which is a fine large apple, resembling a Codlin. It is streaked with a fine red towards the sun, and of a beautiful yellow, with some streaks of red on the other side. It is a very good apple, coming into eating in September, and keeping till the latter end of April.

The Belle Grisdeline, which is a new seedling raised at Norwich, of much beauty, and never failing to afford crops. It was first propagated by Mr. Lindley, about seven years ago, who gave it this name. It is a handsome apple, resembling the Bursdoff, of a yellow colour, with red toward the sun, and an excellent table apple, keeping till March.

The Bell's Pearmain, which is a real Norfolk apple, large and handsome; red toward the sun, and yellow on the other side. It is a fine kitchen fruit, and pretty good to eat raw, keeping till June.

The Best Pool, which is a middle-sized apple, of a pale-green colour, streaked with red towards the sun. It is a good apple, in eating from January to April.

The Black Apple, which is a middle-sized fruit, of a dark mahogany colour next the sun, but fainter on the other side. It is of a pleasant sweet taste, keeping till the middle of April.

The Bland's Summer Pippin, which is a handsome apple, of a gold colour, and an agreeable flavour. It is a great bearer, ripe in September, and keeps till Christmas.

The Blatche's fine small Table-Apple, which is about the size of a small Golden Pippin; red toward the sun, and green on the other side. It has a sugary taste, and comes into eating in January.

The Boomrey, which is a pretty large handsome

apple, of a flat shape, and deep-red colour; and the flesh is streaked with red. It is not fit to eat raw, but will do well for cider, or for the kitchen. It keeps till April.

The Bovey Redstreak, which is a handsome apple, of a flattish shape, beautifully streaked with a bright red next the eye, which is small, and of a yellow colour about the footstalk. It keeps till the latter end of October.

The Broad-eyed Pippin, which is a fine large flat apple, with a very large eye; the colour is a greenish-yellow, with a little red toward the sun. It is a good apple, and keeps till May.

The Brandy Apple, which is about the size of a Golden Pippin, flat-shaped, and of a yellowish russet colour. It is of a pleasant flavour; comes into eating in January, and keeps till March.

The Bursdoff, or Queen's Apple, which is a beautiful fruit, red next the sun, and of a fine yellow on the other side. It is a very fine apple; in Mr. Forsyth's opinion, next in perfection to the Golden Pippin, and about the same size. It is in eating from November to the end of March.

The Cadbury Pound, which is a middle-sized apple, of a light-green colour. It is of a good flavour; ripening in January, and keeping till March.

The Carnation Apple, which is a beautiful middle-sized fruit, finely striped with red. It is ripe in January, and keeps till May.

The Carbury Pippin, which in size and shape resembles the French Crab, and is of a deep green colour. It is a good baking apple, keeping till March.

The Caraway Russet, which is a handsome russet-coloured apple, about the size of a Nonpareil.

The Calville, Red and White, which are good apples, and of a vinous taste. Some have a red and some a white pulp, the white being reckoned of a most delicious taste. They are in eating in September and the following month.

The Cat's Head, which is a large oblong apple, of a greenish-yellow colour, with a little brownish red next the sun; sometimes the colour inclines to a russet. It is a good baking apple, and is in eating from October to December.

The Cockagee, which is a conical-shaped middle-sized apple, red on that side next the sun, and of a fine yellow colour on the other. If properly managed, the fruit keeps till February. It is a famous cider apple, and also bakes well.

The Codlin, which is generally the first apple that is brought to market. Its fruit is so well known that it needs no description. It is in eating from July to December; and is good either for baking or boiling.

The Cornish Nonpareil, which is rather under the middle size, is a little flatted, and of a russet colour. It is a very good apple, and keeps till the middle of March.

The Cornish Pearmain, which is of a middling size, and long shape; of a dull green colour on one side, and russet on the other. It is a very good apple, and keeps till the latter end of April.

The Court-of-Wick Pippin, which is described by Mr. Billingsly, in his "Survey of Somersetshire," as "the favourite apple, both as a table- and cider-fruit, taking its name from the spot where it was first produced. It originated from the pip or seed of the Golden Pippin, and may be considered as a beautiful variety of that fruit. In shape, colour, and flavour, it has not its superior: the tree is large, handsome, and spreading, and a very luxuriant bearer. On the whole, it cannot be too strongly recommended," It is larger than the Golden Pippin, of a yellowish-green colour, and a little tinged with red next the sun. It comes into eating in January.

The Cockles Pippin, which is a handsome oval-shaped apple, below the middle size, of a russet colour, mixed with yellow and red. It keeps till April.

The Corpendu, or Hanging Body, which is a very large apple, and has a red cast on the side towards the sun; but is pale on the other side. It takes its name from always hanging downwards; and comes into eating in September.

The Dalmahoy Pippin, which is about the size of a Golden Pippin, of a green colour, and a little streaked with red towards the sun. It has a tolerably good flavour, rather sharp; and is in eating from September to February.

The Dimock's Red, which is under the middle size, of a fine red colour, intermixed with a little yellow on the side from the sun. It is ripe in January, and keeps till March.

The Dredge's Seedling, which is a fine large apple, striped with red next the sun, and of a yellowish-green on the other side. This is an excellent kitchen apple, of a pleasant taste, and keeps till the latter end of January.

The Dredge's Beauty of Wilts, which is a beautiful apple, of a good size, and one of the finest yet known in point of general utility. It is of a fine bright yellow colour, spotted with red towards the sun; and has an excellent vinous flavour. It is good either for the table or baking, and keeps till March.

The Dredge's Russet, which is a small apple,

of a greenish-russet colour, and of a pleasant flavour. It is ripe in November, and keeps till Midsummer.

The Dredge's White Lily, which is a fine apple, of an exceeding high flavour, and keeps till March.

The Dredge's Fair Maid of Wishford, which is a fine middle-sized apple, of a yellowish-green colour, with some russet next the sun, and of an excellent flavour. It is a great bearer, and is in eating from Christmas to Easter, being an excellent dessert apple.

The Dredge's Queen Charlotte, which is a beautiful middle-sized apple, of a gold colour, with red towards the sun. It is of an exquisite flavour, comes into eating about Christmas, and keeps till February.

The Dredge's Fame, which is a good-sized apple, red towards the sun, and streaked like the Ribston Pippin on the other side. It is a most excellent apple, being in eating from Easter to Midsummer.

The Dumpling Apple, which is a handsome apple, and rather above the middle size, flat-shaped, and of a greenish-yellow colour, with some faint streaks of red. It keeps till March.

The Dutch Queening, which is a large apple, somewhat resembling the Cat's Head in shape. The colour is red next the sun, and green on the other side, with sometimes a little red. The fruit is fit only for the kitchen, and for making cider. It is ripe in January, keeping till the end of March.

The Elton's Yellow Kernel, which is a handsome middle-sized apple, of a yellow colour. It is a good table apple, being in eating from January to March.

The English Rennet, which is a handsome apple, beautifully streaked with red, but darkest towards the sun; of a tolerable flavour, but apt to grow mealy when kept too long. It keeps till the middle of May.

The Embroidered Apple, which is pretty large, and the stripes of red very broad, from which circumstance it takes its name. It is commonly used as a kitchen apple, becoming ripe in October.

The Everlasting Striped Apple, which is below the middle size, of a conical shape. The colour is a striped green towards the footstalk, and red towards the eye.

The Fameuse, which is a pretty large apple, of a beautiful dark red, with a little yellow on the side from the sun. Its flesh is very white, and full of a rich sugary juice; coming into eating about the latter end of October. It was introduced from Canada by Mr. Barclay of Brompton.

The Fenouillet, ou Pomme d'Anis, the Fennel or Anise Apple, which is a middle-sized fruit, of a gray colour; the pulp is tender, and has a spicy taste, like aniseed. It becomes ripe in September and October.

The Flower of Kent, which is a large handsome apple, of a yellow colour, and pretty good flavour. It keeps till the middle of April.

The Fox-whelp, which is a small apple, streaked with red. It is ripe in January. It is a cider apple.

The Franklin's Golden Pippin, which is a handsome middle-sized apple, of a conical shape and gold colour, beautifully marked with dark spots. The fruit has a fine aromatic flavour, and deserves the first place at the table; but it is a shy bearer. It comes into eating about the middle of November.

The French Crab, which is a large handsome apple, of a deep green colour, with a little red next the sun. It will keep all the year; is a good baking apple, and, if the summer be warm, pretty good for eating, and is a great bearer.

The French Codlin, which is a pretty large apple, of a conical shape, and green colour, with red towards the sun, coming into eating in January.

The Fearn's Pippin, which is of the shape and size of a Nonpareil. It is of a beautiful scarlet next the sun, and of a golden yellow on the other side. It makes a fine show at table, and keeps till the latter end of February.

The French Spaniard, which is a large apple, in form of a hexagonal prism with the angles a little rounded, and of a yellowish-green colour: is pretty good, and keeps till the latter end of April.

The French or White Rennet, which is a large fruit, of a yellowish-green colour, with some gray spots. It has a sugary juice, and is good either for eating or baking.

The Gargey Pippin, which is a handsome conical-shaped apple, under the middle size, of a greenish yellow colour, with a little red towards the sun. This is a pretty good apple, and keeps till May.

The Gilliflower, which is a fine handsome apple, red towards the sun, and of a yellowish-green on the other side, having a fine flavour, and keeping till the latter end of March.

The Golden Rennet, which is a beautiful apple, a little flatted; of a fine red colour towards the sun, and yellow on the other side. It is a good eating apple, and keeps till February.

The Golden Russet, which is a fine middle-sized apple, of a golden-russet colour, from which it takes its name. It is a good apple, and keeps long.

The Golden Pearmain, which is a fine apple, above the middle size, of a fine deep red towards the sun, with a little yellow on the other side: when much exposed to the sun it is sometimes red all over.

The Golden Mundi, which is a fine handsome apple, beautifully streaked with red; of a good flavour, excellent for baking, and will keep till January. It is a good sauce apple.

The Golden Glocester, which is a handsome middle-sized apple, of a flat shape, and gold colour, with red toward the sun. It is a good apple, and keeps till March.

The Golden Knob is a handsome though rather small apple, of a fine gold colour, sometimes inclining to a russet. It has a pleasant flavour.

The Golden Pippin is well known; and the French own it to be of English origin. It is almost peculiar to this country; for there are few countries abroad where it succeeds well. It is yellow as gold; the juice is very sweet; the skin (especially where exposed to the sun) is often freckled with dark yellow spots. It is certainly the most antient as well as the most excellent apple that we have. It ripens in October, and keeps through the winter. It has several sub-varieties.

The Godolphin Apple, which is a very handsome large fine fruit, streaked with red on the side next the sun, and of a yellowish colour on the other side. It is in eating from the latter end of September to December.

The Green Dragon, which is a fine large apple, of an excellent flavour, and pale-green colour. It is rather too large for the table, and is therefore mostly used as a kitchen apple. It keeps till March.

The Great or Large Russet, which is a middle-sized fruit, of a russet-colour, with a little dark-red toward the sun. A pretty good apple, and keeps till April.

The Griddleton Pippin, which is a large angular-shaped apple, of a green colour, with a little blush toward the sun. It is a baking apple, and keeps till March.

The Grumas's Pippin, which is about the size and shape of a Golden Pippin; of a dingey-green colour next the sun, and of a dull yellow on the other side. It is ripe in January, and keeps till April.

The Hagloe Crab, which is a yellow-coloured conical-shaped apple, below the middle size. It is ripe in January; but is only fit for making cider, or for baking.

The Hall Door, which is a fine large apple, of a flat shape, beautifully streaked with red toward the sun, and of a greenish-yellow on the other side. It is of a fine flavour, and is in eating from January till March.

The Hallingbury, which is a large flat-shaped apple, with large ridges from the base to the crown. It is of a beautiful red toward the sun, and of a yellowish colour on the other side and towards the eye.

The Hampshire Nonsuch, which is a pretty large well-shaped apple, of a greenish-yellow colour, streaked with red. It keeps till the latter end of November.

The Harvey's Russet, which is so called in Cornwall, is a large russet-coloured apple, with a little red toward the sun. It is a famous kitchen fruit, and tolerably good raw, with a musky flavour.

The Holland Pippin, which is a middle-sized apple of a flattish shape. Its colour is yellow, in some places inclining to green, with, sometimes, a little red toward the sun. It is a pretty good apple, keeping till the middle of April.

The Hollow-eyed Pippin, which is a middle-sized apple, of a yellow colour, beautifully spotted with red toward the sun; and the eye is pretty deep. It is a good sharp-flavoured apple, keeping till the middle of May.

The Hollow-eyed Rennet of Cornwall, which is a handsome flat-shaped apple, under the middle size, of a greenish-yellow colour, sometimes intermixed with russet. It is of an excellent flavour, and keeps till April.

The Hedge Apple, which is a new fruit, of middle size and handsome conical shape, red toward the sun, and of a straw-colour on the other side. It is of a tolerably good flavour, and keeps till the latter end of April.

The Hogshead Apple, which is a small red fruit; the flesh is red, and the taste austere. It is a cider apple, becomes ripe in January, and keeps till March.

The Hubbard's, or the Russet Pearmain, which is a real Norfolk apple; and, though not handsome, is one of the best table apples. It is of a dark russet colour, becomes ripe in January, and keeps till April.

The John Apple, which is a middle-sized handsome fruit, of a green colour, with a little red toward the sun; the foot-stalk being very small. It is an excellent cider and baking apple, from Devonshire; is of an excellent flavour, and keeps till March.

The Isle-of-Wight Pippin, which is a handsome middle-sized apple, of a greenish-yellow colour.

The Juneting, or Jenneting, which is a small yellowish apple, red on the side next the sun. It is a pretty fruit for early variety, and ripens

about the latter end of June or beginning of the following month.

The Kernel Redstreak, which is of a greenish-yellow, with broad streaks of a dark-red all over it, and a yellow ground finely speckled with red next the sun.

The Kernel Pearmain, which is a small handsome apple, red toward the sun, and of a yellowish-green mixed with red on the other side. It is of a good flavour, keeping till the middle of May.

The Kentish Pippin, which is a good-sized apple, finely streaked with red. It is of a fine flavour, comes into eating about Christmas, and keeps till February.

The Kentish Nonpareil, which is a handsome flat-shaped apple, of a light-russet colour, inclining to red toward the sun. It is of a good flavour; and keeps till May.

The King of the Pippins, which is a middle-sized apple, of a fine gold colour, a little streaked with red towards the sun. It is ripe in January, and keeps till the latter end of March, when it becomes mealy.

The King Apple, which is a middle-sized apple, of a conical shape; and its colour is that of a beautiful red intermixed with a little yellow on one side. This apple is of a pleasant sugary taste, and keeps till the latter end of April.

The Kirke's Seedling, which is a large beautiful apple of a fine red colour towards the base, and yellow toward the eye. The footstalk is slender, and the eye large.

The Kirke's Scarlet Pearmain, which is a handsome middle-sized apple, of a beautiful red toward the sun, and a little yellow on the other side; becoming ripe in January.

The Kirke's Scarlet Admirable, which is a good apple for baking, and of a beautiful scarlet colour, is in eating about the month of January.

The Kentish Fill-Basket, which is a species of Codlin, of a large size, and generally used for baking. It is in eating from August to October.

The Kirton or Crack'd Pippin, which is a middle-sized apple, of a greenish-yellow colour, with little dark spots. The coat is generally rough toward the footstalk. It is a good apple for the table, coming into eating in September.

The Lady's Finger, which is an excellent table apple, of a conical shape; red next the sun, and of a yellowish cast on the other side, having a sweet pleasant flavour, and keeping till May.

The Large Styre, which is a handsome cider apple, of a yellow colour, with a little red next the sun. It becomes ripe in November.

The Lisbon Pippin, which is a handsome middle-sized apple, of a flat shape, a fine red toward the sun, and of a reddish-yellow on the other side. The flesh is firm, and has a sharp pleasant taste. It comes into eating in November.

The Loan's Pearmain, which is a lage oval-shaped apple, of a dull green colour intermixed with a brownish red, deepest next the sun. It is a pretty good table apple, of a sharp taste, ripening in September and keeping till May, but is apt to grow mealy.

The London Pippin, or Five-crowned Pippin, which is a fine large apple, of a green colour, streaked with red toward the sun. It resembles the Ribston Pippin, but is larger. It has a pretty agreeable taste; and will come into eating about the latter end of November. It is good for the kitchen and table; and a most abundant bearer. It keeps till the middle of April.

The Le Calville d' Automne, the Autumn Calville, which is a large fruit, of an oblong figure, and of a fine red colour toward the sun, having a vinous juice, and is much esteemed by the French.

The Long Laster, which is a middle-sized apple, of an angular shape, and fine yellow colour, with a beautiful red next the sun. It is of a tolerable flavour, and keeps till the middle of May, but is apt to become mealy.

The Lemon Pippin, which is a handsome oval-shaped apple, of a gold colour. It is of a fine flavour, and will keep till the beginning of March.

The Long Seam, which is a large angular-shaped baking apple, of a pretty good flavour, with light green colour. It keeps till the latter end of January.

The Lord Cheney's Green, which is a middle-sized Yorkshire apple, resembling the Yorkshire Greening. It is of a dark green colour, with a little of a chocolate colour next the sun. It is a baking apple, and keeps till the middle of May.

The Lord Arundel's Apple, which is large, of an angular shape; the colour is green, with a little dingey red toward the sun. It is from France, and good for sauce, keeping well.

The Lord Camden's Rennet, which is a good-sized seedling, of a yellow colour, with a little brownish red next the sun. It is a good-flavoured apple, and keeps till March.

The Lucas's Pippin, which is a handsome middle-sized, cylindrical-shaped apple, of a beautiful orange colour. It is a pretty good fruit, and keeps till the latter end of April.

The Maiden's Blush, which is a small apple, of a dark mahogany colour next the sun, but paler on the other side, and sometimes of a greenish cast. The taste is austere, and of course this fruit is not fit for the table; but does very well for baking, or for cider. It keeps till the beginning of March.

The Mansfield Tart, which is a large Nottingham apple, but most known in Yorkshire. It is handsome, of a green colour, having a little cast of a brownish red, with dark spots next the sun, being a baking apple, and keeping till February.

The May Gennet, which is rather under the middle size, of a greenish-yellow colour, slightly streaked with red next the sun. It keeps till April.

The Major Hemmings's Apple, which is a handsome middle-sized fruit, of a light-green colour, with a little brownish-red towards the sun. It is an excellent apple.

The Margil, which is an excellent apple, about the size of a Nonpareil. It is of a red colour with some yellow on one side; continues in use from November to the latter end of March; and is often sold in the London markets for a Nonpareil.

The Margaret Apple, which is a fine and beautiful fruit, yellow striped with red, of a delicate taste, sweet scent, and generally eaten off the tree. It is ripe in August.

The Minchall Crab, which is a handsome middle-sized Lancashire apple, of a yellow colour, with some brown spots. It is common in the Manchester market, and keeps till April.

The Monstrous Rennet, which is a very large apple, turning red towards the sun, and of a dark-green on the other side. It is generally preserved on account of its magnitude, as the flesh is apt to be mealy. It becomes ripe in October.

The Mother Rennet, which is rather under the middle size, of a greenish colour, with a little blush towards the sun. The eye is large and deep, and the footstalk small.

The New-England Pippin, which is a large angular-shaped apple, of a green colour, with a little brownish-red towards the sun. It has a pretty good flavour, and keeps till March.

The Newtown Pippin, which according to Mr. Forsyth is an American Apple, but said to be originally from Devonshire. It is a fine large apple, of a greenish-yellow colour, and red, with dark spots next the sun. When much exposed, it is of a beautiful red towards the sun, and of a gold colour on the other side. It has a fine flavour when not kept till it is too ripe, as then it becomes mealy. It is in eating from November to January.

The New Red Must, which is a fine large apple, of a pale red towards the footstalk, and of a greenish colour towards the eye. It is a cider apple, and for baking.

The New Red Pippin, which is a beautiful middle-sized apple of a dark-red colour, with a mixture of yellow on the side from the sun. It keeps till March.

The Nonsuch, which is a good bearer, and very fit either for the table or kitchen; the cooks, however, complain that it makes but a very small proportion of sauce. It is ripe in September and October.

The Nine Square, which, according to Forsyth, is a Gloucestershire apple. It is a large angular-shaped fruit, of a fine red towards the sun, and yellow on the other side, with a small mixture of red, keeping till April.

The Norfolk Colman, which is a middle-sized apple, of a mahogany colour towards the sun, and a dark green on the other side. It keeps till August.

The Norfolk Beefin, which is a good-sized apple, rather flatted, of a deep red colour towards the eye, but paler towards the footstalk.

The Norfolk Paradise, which is a large apple, of a dark red colour towards the sun, and green on the other side. It is a nice baking apple, and of a tolerable flavour for eating. It keeps till the middle of May.

The Norfolk Storing, which is a pretty large apple, of a dark red colour towards the footstalk, and green towards the eye. It is of a pleasant sharp flavour, being in eating from the latter end of January to the latter end of April.

The Northern Greening, which is a fine oblong apple, full at the footstalk, of a pale-green colour, with a little red towards the sun. It is nearly of an equal size from the base to the crown, and has a fine flavour, being ripe in January.

The Nonpareil, which is a fruit deservedly valued for the briskness of its taste. It is seldom ripe before Christmas, and, if well preserved, will keep till May. It is justly esteemed one of the best apples that have been yet known.

The Oak Peg, or Oaken Pin, which is an oval-shaped middle-sized fruit, of a green colour striped with white. It is very full towards the footstalk, which is small, keeping till June.

The Old English Pearmain, which is an oval-shaped apple, of a middle size, and fine red colour, with a little yellow towards the eye. It is of a pleasant sweet flavour; and is in eating from January to March.

The Old Red Must, which is a fine large apple, somewhat resembling the New Red Must

both in shape and colour, with the addition of dark red spots toward the footstalk.

The Old Red Pippin, which is a middle-sized apple, red towards the sun, and of a greenish colour on the other side. It is a good apple, and keeps till March.

The Orange Pippin, which is about the size of a large Golden Pippin; of a beautiful gold colour, with a little pale-red towards the sun. It is a handsome apple, of a good flavour, and makes a fine appearance at table, being in eating in October, and keeps till March, but gets flat in the taste when too long kept.

The Orleans Pippin, which is a small flat-shaped apple, of a dark red colour; resembling the Orleans Plum.

The Paradise Pippin, which is a handsome middle-sized apple, of a reddish cast. It comes into eating in October, but will not keep. It grows mealy when too ripe.

The Pauson, which is below the middle size, of a conical shape, and of a greenish yellow or light green colour. It is ripe in January.

The Pile's Russet, which is a middle-sized longish-shaped apple, russet about the footstalk, yellow towards the middle, and of a brownish red about the eye. It is a very firm fruit, of a sharp acid flavour, being much esteemed for baking. It ripens in October, and will keep till April.

The Pigeonette, which is rather below the middle size, of a conical shape. It is of a pink colour, pretty dark towards the sun.

The Pearson's Pippin, which is a nice apple, about the size of a large Golden Pippin, of a yellowish colour, and the form a little flat. In Devonshire, according to Mr. Forsyth, they put these Pippins into the oven just after the bread is drawn, laying a weight over them to flatten them, in the same manner as they do the Beefin in Norfolk, and bring them to table as a sweetmeat. It is a very good dessert apple, and keeps till March.

The Pomme Grise, which is a fine apple, from Canada, of a flattish form, and russet colour, streaked beautifully with red. It ripens late, and keeps till March. It is an excellent eating apple.

The Pomme d'Api, which is much valued for its colour, being of a bright red. The tree is a good bearer, and the fruit is not subject to be shaken with high winds. The fruit should be suffered to hang on the tree till October or November, if the frost do not set in. It comes into eating in February and March, and keeps long; but is more admired for its beauty than its flavour or fineness of taste.

The Pomme Violette, the Violet Apple, which is a pretty large fruit, of a pale-green, striped with red towards the sun. It has a sugary juice, and a flavour of violets, from which it takes its name. It ripens in October, and continues in eating till February or later.

The Pomroy, or King's Apple, which ripens nearly as soon as the Juneting; and, though not so beautifully covered, is larger and much better tasted. It has a sub-variety, which is a winter apple.

The Pound Pippin, which is a large handsome apple of a greenish colour; and is good for baking. It becomes ripe in January.

The Poor Man's Profit, which is a dingey-coloured oval-shaped apple, below the middle size. It is raised freely from cuttings; and keeps till January.

The Queening, which is from Gloucestershire, is a large apple of an irregular shape, having large ridges from the base to the crown. It is of a dark red, but deepest towards the sun. It is a good cider apple, and bakes well, keeping till the latter end of November.

The Queening Kernel, which is a fine apple, above the middle size, of a deep red colour, covered very thick with small whitish specks. It is a tolerably good apple, and keeps till the latter end of April.

The Queen's Pippin, which is a small handsome apple, of a yellowish-green colour, sometimes inclining to red on the side next the sun. It is a fine-flavoured apple, very fit for the table, coming into eating in January, and keeping till May; but is apt to grow mealy when kept too long. Mr. Forsyth says, "the tree never grows to the height of other apple-trees."

The Quince Apple, which is a middle-sized fruit, of a yellow colour, with a little red towards the eye. It is of a pleasant sharp flavour; ripe in January, and keeps till April.

The Ramborn, which is a large fruit, of a fine red next the sun, and striped with a yellowish green. It ripens about the middle of September.

The Red Pearmain, which is smaller than the Pearmains in general. It is of a deep red, with a little yellow on one side. A pleasant sweet apple; and keeps till the middle of April.

The Red Streak, which is a handsome middle-sized apple, beautifully streaked with red. It is a good cider apple, becoming ripe in January.

The Red Streak Seedling, from Longleat, which is from the Dorsetshire Red Streak, is a beautiful apple, of a yellow colour streaked with red, particularly next the sun. Forsyth says, it is sold in the Bath and Bristol markets in the latter end of September and begin-

ning of October. It is a pretty good apple, but does not keep long.

The Red Bag, which is a beautiful large Herefordshire apple, of a longish shape, streaked all over with a dark red; and is in eating about the middle of October.

The Red Must, which resembles the Old Red Must in shape; but is of a dark red colour towards the sun, and yellow on the other side. It is ripe about the middle of November.

The Rennette Grise, which is a middle-sized fruit, of a gray colour next the sun; it is a very good juicy apple, of a quick flavour, and ripens about the latter end of October.

The Red Sweet, which is a small round apple, red towards the sun, and of a greenish-yellow on the other side. It is a good bearer, according to Forsyth, "and much esteemed among the country people of Cornwall for making a kind of tart or pie, one of their dainties at Christmas." It is a pretty good table apple, and keeps till March.

The Ribston Pippin, which is a fine apple, from Ribston Hall, near Knaresborough, in Yorkshire. It is a little streaked with red towards the sun, and yellow on the other side, being one of the best apples for eating and baking, and continues in use from the end of October till April. It bears very well as a dwarf, and no garden should be without it.

The Robinson's Pippin, which is about the size of a Golden Pippin, of a green colour, and partakes of the flavour both of a Golden Pippin and a Nonpareil. It keeps till May.

The Royal George, which is a fine large apple, of a beautiful yellow on one side and green on the other. It is a good apple, and keeps till June, but then grows mealy.

The Royal Nonpareil, which is a handsome apple, of a flattish shape, with a small footstalk and fine eye. It is about the size of a common Nonpareil, of a green colour, with red towards the sun. It is ripe in January, and keeps till the latter end of March.

The Royal Pearmain, which is a fine large apple, beautifully streaked with red. It is ripe in January and keeps till March, being a pretty good apple.

The Royal Russet, or Leather-coat Russet, which is a large fruit, and one of the best kitchen apples that we have. It is also a pleasant eating apple, and a great bearer, being in use from October to April.

The Russet Pippin, which is of a rough russet colour towards the sun, and of a green colour, sometimes inclining to yellow, on the other side. It is a good keeping apple, and fit either for baking or eating raw. It is ripe about the beginning of February, and keeps till March.

The Red and White Calville, which are good apples, of a vinous taste; some have a red, and some a white pulp; and the white is reckoned of a most delicious flavour. They are in eating in September and October.

The Summer Pearmain, which is striped with red next the sun; the flesh is soft, but soon turns mealy; so that it is not much esteemed. It is in eating in August and September.

The Silver Pippin, which is a handsome middle-sized conical-shaped apple, of a fine yellow colour, with a faint blush towards the sun. The flesh is firm and very white, and of an excellent flavour. It keeps till the middle of May, or later.

The Seek no Farther, which is a handsome apple, rather above the middle size, of a pale-green colour, a little streaked with red. It is of a pleasant though not very high flavour; and is in eating from January to May; but is apt to be mealy when kept longer than the beginning of April.

The Sykehouse, which is a handsome middle-sized apple, from Sykehouse in Yorkshire, of an orange colour towards the sun, sometimes inclining to red, and yellow on the other side. This is a fine eating apple; ripe in January, and keeps till April.

The Stone Pippin, which is of a green colour streaked with red towards the sun. It is of a sharp taste, and is in eating from January till the middle of May.

The Stoup Codlin, which is a large handsome apple, of a pale-green colour, with a little red towards the sun. It is a baking apple, of a pleasant taste. It keeps till May.

The Striped Nonpareil Russet, which is a handsome apple, of a greenish-russet colour, with a little brownish-red towards the sun. It is about the size of a large Nonpareil, is ripe in January, and keeps till March.

The Spice Apple, which is a handsome middle-sized angular-shaped apple, of a yellow colour, and a pleasant flavour. It is ripe in January, and keeps till March.

The Skerm's Kernel, which is a conical-shaped middle-sized apple, beautifully streaked with red, deepest towards the eye, and having a good deal of yellow towards the footstalk. It is ripe in January, and keeps till March.

The Spice Rennet, which is a handsome apple, below the middle size, red towards the sun, and yellow on the other side.

The Spanish Pearmain, which is a middle-sized oblong apple, of a carnation colour, and dark-red towards the sun. It is a pretty good apple, and keeps till the beginning of May.

The Spanish Onion, which is a handsome round apple of a russet colour, with a dull red towards the sun. This apple, which is rather below the middle size, is very good for the dessert, keeping till March.

The Sharp's Russet, which is below the middle size, of a brownish-red colour towards the sun, and a pale green on the other side. It is shaped like the frustum of a cone; is of a pretty good flavour, and keeps till May.

The Spencer's Pippin, which is a middle-sized apple, of a yellowish colour, with many dark spots, being a baking apple, and keeping till the middle of May.

The Tankerton, which is a conical-shaped yellow apple, with sometimes a little blush towards the sun. It is an excellent sauce apple, and bakes well, being of an agreeable taste, but too large for the table. It will keep till February.

The Transparent Apple, which was introduced from St. Petersburg; but is more curious than useful: a tree or two, therefore, will be sufficient for a garden. It ripens in September and October.

The Trevoider Rennet, which is a small handsome russet-coloured apple, of an excellent flavour, and will keep till May.

The White Corpendu, which is a middle-sized long-shaped apple, of a yellowish colour. It is a good eating apple, and ripens in January.

The Ward Apple, which is a beautiful flat-shaped apple, rather below the middle size, of a fine red towards the eye, and of a yellowish-green towards the footstalk. It is a sharp-flavoured fruit, and keeps till June.

The Wheeler's Russet, which is of middling size, the flesh firm, and of a quick acid flavour; it is an excellent kitchen fruit, and keeps long. It ripens in October.

The Wine Russet, which is a middle-sized conical-shaped apple, of a dark russet colour, and sharp flavour. It keeps till the latter end of April.

The Wheeler's Extreme, which resembles the Pomme Grise, and is about the size of a Nonpareil. It is a flat-shaped apple, beautifully clouded with red on a yellowish-russet ground; is of an excellent flavour, and keeps till April.

The White Must, which is a middle-sized handsome apple, of a greenish-yellow colour, with a little red towards the sun; the flavour is rather tart, but agreeable. It is ripe in January.

The Whitmore Pippin, which is a good-sized handsome apple, streaked with red towards the sun, and of a pale yellow on the other side. It has firm flesh, of a tolerably good flavour, and is in eating from November to the latter end of April, or later.

The Wiltshire Cat's-head, which is a large handsome apple, red towards the sun, and green on the other side. It is a very fine baking apple, and of a good flavour, being ripe in January.

The Winter Pearmain, or Herefordshire Pearmain, which is of a fine red next the sun, and striped with red on the other side; the flesh is juicy, and stews well. It is fit for use in November, and if properly managed will keep till the latter end of March.

The Winter Pomroy, which is a pretty large conical-shaped apple, of a dark-green colour, a little streaked with red towards the sun. The coat is rather tough. It is a good baking apple, keeping till January.

The Winter Box Apple, which is a middle-sized fruit, of a light-green colour, and keeps till February.

The Woodcock, which is a good-sized apple, of a dark-red next the sun, and paler, with a little mixture of yellow, on the other side. It is ripe in January, and keeps till March, being a good cider apple.

The Wright's Nonpareil, which is a Salopian apple, being a great bearer, of a good size, and a little flatted. It is a good kitchen apple, and keeps till June. The tree is smaller in size than most other apple-trees.

The Yorkshire Greening, which is a good-sized flatted apple, of a dull-red colour, with a little green towards the eye. It keeps till August, or often later.

To these the following list has been subjoined, of useful Apples, for different purposes:

The Aged Pippin; the Aromatic Broading, which is sometimes known by the title of the Summer Broading; the Autumn Pearmain; the Barcelona Pearmain, the Beaufin, which are good for baking, and sometimes known by the names of the Lincolnshire Beaufin, the Yorkshire Beaufin, and the Norfolk Beefin; the Black Moor, which is good for cider; the Bontradue, the Cawood Timely, which is good for eating; the Chardin's Sans-pareil, which is good for eating; the Chester Pearmain; the Costard, which is proper for cider; the Cotton Pippin, the Covadies, the Darling Pippin, the Derbyshire Crab, the Devonshire Buckland, the Double-blossom Scarlet Crab, the Dowsen's, the Dutch Paradise; the Early Nonpareil, also good for eating; the Everlasting Hanger, which is good for cider; the Eyer's Greening, also good for baking; the Frank Rambour, the Frazer's, the French Pippin, the French Paradise; the Gennet Moyle, good for cider; the Golden Doucet, the Golden Noble, the Golden Lustre, the Gray Noble, the Gray's Pippin; the Green

Blundrel, which is good for cider; the Green Pearmain, which is also proper for that liquor; the Havers's Monster, the Hay's fine large baking Apple; the Hertfordshire Under-leaf, which is fine for cider; the Hughes's New Golden Pippin, the June Keeping, the Kipling's Pippin, the Kirke's Incomparable; the Kitchen Rennet, good for baking; the Lancashire Housewife, useful in the same way; the Large Yellow Pippin, the Large Golden Pippin, good for eating, sometimes known by the name of *Baker's Golden Pippin*; the Large Apple Williamson, the Lawman's; the Lincolnshire Rennet, proper for baking; Lord Islay's Pippin, the Neal's Summer Kentish; the New England, good for baking; the New York Pippin, the Nutmeg, the Orgeline, or Orjeline; the Oxhead Pearmain, esteemed for eating, also known by the name of *Earl of Yarmouth's Pearmain*; the Pie Pie, the Pine-Apple Russet, the Pipy Russet; the Pomphilia, esteemed for eating; the Queen's Pearmain, the Red-fleshed Beaufin, the Red Vacan, the Ronald's Queen Charlotte; the Robine, good for baking; the Royal Wilding, proper for cider; the Scarlet Pearmain, the Sheppard's Russet, the Siberian Crab, the Sir Charles Wager's, the Spit, the Stout Buckland; the Striped Beaufin, which is good for baking; the Stubbard; the Styre, proper for cider; the Summer Redstreak, which is also used in the same way; the Summer Pippin, the Summer Russet; the Summer Colman, which is good for baking; the Summer Majetin, the Ten Shillings, the Tom Two Years Old; the Transparent Codlin, esteemed for baking; the Virgin; the White Pippin, good for eating; the White Sour, the Welch Lemon Pippin, the Whykins's Pippin, the Wine Sop; the Winter Redstreak, esteemed for cider; the Winter Colman, good for baking; the Winter Broading, also proper for baking; the Winter Majetin, and the Yellow Buckland.

The sorts of apples advised for a small garden are the following: The Juneting, the Golden Pippins, the Nonsuch, the Ribston Pippin, the Nonpareils, the Queen's Apple, the Sykehouse, the Golden Rennet, the Aromatic Pippin, the Gray Leadington, the Scarlet Pearmain, the Lemon Pippin, the Pomme Grise, the French Crab, and different sorts of Russetins and Codlins, for baking.

There are other varieties and sub-varieties that may be equally valuable with many of the above.

The third is a tree which, when it blossoms in perfection, is highly ornamental. It blossoms about the end of April or beginning of May. The flowers are large, of a pale red when open, and semi-double; the buds are of a much deeper hue. The fruit is sparingly produced, and of little value. It is probably a native of China.

The fourth species has a strong woody stem, sending out many side-branches, and covered with a smooth brown bark. The leaves are shaped like those of the cherry-tree; are of a deep green on their upper side, but paler on their under, slightly serrate, and on long foot-stalks. The flowers come out in bunches from the side of the branches on long slender peduncles; the petals are white, and shaped like those of the first sort, appearing in April; and are succeeded by roundish fruit, about the size of large Duke cherries, changing to a yellowish colour variegated with red, of a very austere taste, decaying like the fruit of the Medlar, and then more palatable. It is supposed to be a native of Siberia. There are varieties in the size of the fruit.

The fifth has the umbel on smooth peduncles. The calyxes are smooth on the outside; to mentose within: the leaves like those of the Apple, but more smooth, and more finely serrate, longer and narrower, and cut into acute angles on their sides. The flowers have a fragrant odour. It is a native of America, where the inhabitants plant them for stocks to graft apples upon. It flowers here in May.

The sixth species is a low crooked and distorted tree, covered with a brown bark, and much branched. The leaves are roundish or ovate, entire, above dusky green, underneath whitish, on short petioles. The flowers large. Corolla pale red or white. The calyx spreading, serrate, the length of the corolla. The fruit a pome, varying in shape in the different varieties —globular, oblong or pear-shaped. It is supposed a native of Austria &c.; flowering in May and June.

There are the following varieties:—The Pear Quince, with oblong-ovate leaves, and an oblong fruit lengthened at the base; the Apple Quince, with ovate leaves and a rounder fruit; the Portugal Quince, with obovate leaves, and an oblong fruit which is more juicy and less harsh than the others, and therefore the most valuable.

The Quince is a very beautiful tree when in flower, as well as when the fruit is ripe in the autumn, and was cultivated in this country at a very early period. According to Mr. Forsyth, "the best sort for planting in the fruit-garden is the Portugal, being the fittest for baking or stewing. It is of a fine purple colour when dressed, and is much better for marmalade than any of the other sorts. The oblong kind, and the Apple Quince, are also planted," he says

"in these situations, and other sorts are employed in the shubberies for producing variety."

The above sort is likewise valuable for mixing with apples in making pies, puddings, &c. as they add a quickness to the flavour when flat.

Culture in the Pear kind—These trees are raised by grafting and budding upon any kinds of pear-stocks; occasionally upon quince-stocks, and sometimes upon white-thorn stocks; but the first sort are preferable for general use to have large trees, and the second for moderate growers.

The numerous varieties of these trees having been first accidentally obtained from seed, and as these seedlings rarely produce the same sorts again, the approved kinds are continued and increased only by grafting or budding upon stocks raised from the kernels of the kinds just mentioned. In order to restrain the growth of these trees white-thorn stocks have also been used; but these are not so generally successful, and are almost in total disuse in the nurseries: of course pear-stocks are proper for general use, for principal large trees, both for walls, espaliers, and standards; and quince-stocks for smaller growths. For raising the stocks, the seeds or kernels of the different sorts should be sown in the latter end of autumn, as October, November, or December, or early in the spring, in beds of light earth, covering them near an inch deep; they come up in the spring: and in autumn, winter, or spring following, the strongest should be planted out in nursery-rows to remain for grafting and budding, for which, after having from one to two or three years' growth, they will be of proper size.

The operations of grafting and budding should be performed in the usual method; the former in the spring, and the latter in summer. See GRAFTING and BUDDING. For this purpose the grafts and buds should be procured from such trees as produce the finest fruit of the respective sorts; those designed as dwarfs for walls, espaliers, or standard-dwarfs, being grafted or budded near the bottom; and in those for half and full standards, the stocks may either be previously trained up from three or four to seven or eight feet high to form a stem, then grafted near the top, or be grafted low in the stock, like the dwarfs, and the first main shoot trained for a stem the above height: the grafted trees, both dwarfs and standards, shoot the same year, but the budded ones not till the spring after; and when their heads are two years old from the grafting and budding, they may, if thought proper, be planted out for good, or remain longer in the nursery, as may be found convenient.

The dwarfs for walls, espaliers, &c. whether they remain longer in the nursery, or be transplanted at a year old into the garden, should have the first shoots from the graft or bud, when a year old, headed down in March to five or six eyes, to force out a proper supply of four, six, or more lateral branches near the ground, to furnish the wall or espalier with bearers quite from the bottom, these readily producing others to cover the upper part.

Standards, supposing them to be grafted on high stocks, may either be headed near the top of the stock, or permitted to run up, as the case may require, so that if shortened it will force out laterals near the head of the stem, and form a more spreading full head; and if suffered to run up with the first shoots entire, they form higher and generally more upright heads in the end. Such standards, however, as are grafted or budded as low in the stock as for dwarfs, must have the first shoot trained upright at full length, six or seven feet high for a stem; if for full standards, they may either be topped at six feet height, to force out laterals near that part to form a spreading head, or suffered to run and branch in its own way to form a more erect and higher head.

The headed trees, both dwarfs and standards, on being cut down in the spring, soon branch out from all the eyes immediately below; when care should be taken during the summer to trim off all shoots from the stem, suffering all the top shoots to remain entire; when they will form handsome beginning young heads by the end of summer, and in autumn, winter, or spring following, may be finally planted out into the garden, &c.

When from necessity they are retained longer in the nursery, the whole should have proper pruning to reform irregular growths, and the different trees be trained accordingly, suffering the whole to branch away at full length, not shortening any after the above general heading down, when a year old, except it should seem occasionally necessary, either to reduce any casual irregularity, or to procure a more full supply of lower branches; after which no further general shortening should be practised to these sort of trees; for, after having obtained a proper set of regular branches near the head of the stem, they readily furnish more in their turn to increase the head on the upper part.

In regard to planting out the trees, they are mostly of proper growth for this purpose when from one or two to four or five years old, from the graft or bud; but if larger trees are required, those of six or eight years old may be safely

transplanted; younger trees, however, always succeed well, even when only two or three years old.

In selecting pear-trees for planting, Mr. Forsyth advises the choosing of the oldest trees that can be found instead of the young ones, and such as have strong stems; to have them carefully taken up, with as much of the roots as possible, and carefully planted, after cutting in the roots a little, spreading them as horizontally as can be done. Then to fill up all round the roots with light dry mould; forcing it in, about those which lie hollow, with a sharp-pointed stick; filling the whole up to the top without treading the mould, till the hole be first filled with as much water as it will contain, leaving it a day or two until the ground has absorbed the water; then to throw on some fresh dry mould and tread it as hard as possible, filling the hole up again with mould to within an inch of the top, and giving it a second watering, leaving the mould about three inches higher than the border, to settle of itself, and to receive the rain that falls, for at least a month. When the mould has become quite dry, it may be trodden a second time; then make a large bason all round the tree, and giving it another watering, mulching the top over with some rotten leaves or dung, continuing to water the trees once a week in dry weather, and sprinkling the tops frequently with a pot, or hand engine, to keep the wood from shrivelling till they have taken fresh root:—and where the trees are planted against a wall, the stems should stand sloping towards it; the lower parts of them being six inches from the bottom of the wall, to give them room to grow, as when planted close to the wall at bottom, the stems, in growing, will, he says, be confined on the back, grow flat, and be very unsightly. If any roots are in the way, to hinder it from being planted near enough to the wall, they must be cut off; at the same time taking care that the tree does not lean to either side, but that, when viewed in front, it appear perfectly upright. Sometimes standards and half-standards are, he says, seen planted a foot or two from the wall, which gives them a very disagreeable appearance: six inches is, he thinks, quite sufficient. Much care should be taken not to wound the stem or root of the tree in planting.

When young trees have two stems, he advises always to cut off one of them, leaving the stoutest and straightest, planting that side outwards which has most buds on it.

It is added, that when the buds begin to break well, the trees should be headed down to three or four eyes, to fill the wall with fine wood, but never afterward, except the leading shoot to fill the wall, leaving the fore-right shoots to be pruned, as hereafter directed. He has "had some trees that had forty pears on them the second year; while some of the same kind bore only eleven pears the fourteenth year after planting, with the common method of pruning."

When such old trees as recommended above cannot be procured, the stoutest and cleanest of the one-year's old after grafting should, he says, be provided.

Where any of these trees become stunted after a number of years, they should be headed down as hereafter directed, which will bring them into fresh vigour and fruitfulness.

The proper season for planting them out is any time in open weather from the end of October till March, but the autumn or early winter are the most advantageous periods.

They succeed well in any common garden soil, or good fertile orchard-ground, or field, that is not very wet, or of a stiff or stubborn quality, but moderately light and friable to the depth of one spade at least, and if more the better. The ground should be prepared by proper trenching one or two spades deep, as the depth of good soil will admit, wholly if for a full plantation, or only along the place for each row of trees, in the place for each tree; or only a hole for each tree at proper distances.

The proper distance for planting the dwarf sorts for walls or on espaliers, is for those on free stocks at not less than twenty feet, but if twenty-five, or more, the better, especially if the walls be rather low, &c. that there may be full scope to extend their branches considerably in a horizontal direction, as they will effectually fill that space, or even much more if it be allowed them; but they are often planted much nearer together. It is however of importance to give these trees sufficient room, and the higher the walls the better, as is evident by those trees growing against the ends of high buildings, as they extend themselves very considerably every way. Some plant cherry-trees or other moderate shooting fruit-trees in the intervals for a few years, till the pears advance in growth and approach one another, when they should be removed. They are to be planted in the usual way, with their heads entire. See PLANTING.

But for trees that are dwarfed by grafting or budding upon quince-stocks, from fifteen to eighteen feet may be a proper distance for planting, either for walls or espaliers.

In respect to the distance at which pear-trees should be planted against walls, it is observed by Mr. Forsyth that when they "are grafted on free stocks, such as Colmars, Pear D'Auche, Crasanes, L'Eschasseries, Virgouleuses,

and Winter and Summer Bonchrêtiens, it should be at least twelve yards distant from each other, supposing the walls to be from twelve to sixteen feet high; but when they are only ten feet, fifteen yards will be little enough for the purpose."

Where they are planted on south walls, vines, peaches, nectarines, or apricots, may be planted between them, till the trees extend so far as nearly to meet each other: then they may be removed to any other situation in the garden where they are wanted. And where the pears are planted on west walls, the same sort of trees may be planted between them as on south walls; the fruit on a west aspect will, he says, come into use to succeed that on the south. On an east wall different sorts of plums and cherries may be planted, he says, between the pear-trees till they almost meet, then transplanted as standards or wall-trees.

He advises that the borders for pear-trees in a large garden should not be less than from ten to twenty feet wide, with a foot-path about three feet from the wall, covered over at top with coal-ashes or road-sand, to make a dry walk for getting at the trees to cut and nail them, to gather the fruit, &c. And that the depth of the mould for them should never be less than three feet, laying the best mould at top, to encourage the roots to come as near the surface as possible. If the bottom be clay, it will, he says, be very necessary, once in every five or six years, to open the ground round the roots of the trees, and cut off all the large ones that are inclining to run into the clay; as by this practice the trees will throw out fresh roots that will run near the surface, provided the mould is good near the top of the borders.

He suggests that a crop of early peas, lettuces, spinach, or any other small crops, may be grown on the borders, during the winter and spring; but no late crops by any means. If the ground can be spared, he would advise to have no summer crops, but keep the borders hoed, in particular after rain; otherwise the ground, if a strong loamy or clayey soil, will be apt to crack in dry weather; but by frequent stirring between wet and dry this will in a great measure be prevented, and the sun's rays admitted into the mould, which will greatly heighten the flavour of the fruit. When you can conveniently spare the borders in winter, they should be ridged up to sweeten the mould, which may be very well done if you sow early peas on the sides of the ridges; which is by far the best way to preserve the peas from the frost, and to prevent them from rotting, which will sometimes happen, if the land be strong, before they begin to vegetate: or, you you may sow an early crop of carrots or spinach on these borders.

In regard to the general management in the training and pruning of these trees, if the young wall and espalier trees thus planted are only one year old from the graft or bud, having their first shoots of a year-old entire, these should in the spring be headed down to five or six inches, to force out lower horizontal branches; but if they have been previously headed, as advised above, and have thrown out laterals to form a regular set of horizontal branches, consisting of six or more near the bottom, they should not now be shortened, but trained to the wall or espalier at full length horizontally, preserving an equal number on each side five or six inches asunder: they will readily emit a further supply of horizontal shoots to cover the wall, &c. regularly upward, and at the same time not being shortened, they gradually form themselves for bearing, as every shortening of the branches of these trees retards their bearing a year at least: if, however, there is a want of branches, some of the middlemost may be pruned short, and trained to the wall or espalier. According as the trees shoot in summer, a further supply of all the regular shoots in every part where they occur, should be trained in at full length, unless it shall seem necessary to prune some strong shoots to obtain a greater supply of horizontal branches the same year, in order to furnish the head as soon as possible: at this time, however, displace all the fore-right and other irregular growths of the year, continuing the supply of regular shoots close to the wall, as they advance in length during their summer's growth. And in the winter pruning, the supply of shoots attained in summer should be well examined, selecting all those that are well placed and properly situated for training in, to increase the number of horizontal branches on each side, which should be left wholly entire, and at the same time retrenching any superfluities and ill-placed shoots omitted in summer; then the whole supply of regular horizontal branches in every part should be trained in straight and close to the wall or espalier, equally on both sides of the tree, every branch at the full length, at four, five, or six inches apart. See WALL- and ESPALIER-TREES, and PRUNING.

There is another method sometimes practised in training these trees for walls and espaliers, which is, that after their first heading down and having thrown out several laterals, to select three of the strongest and most regularly placed, one on each side and one in the middle, nailing the two side ones horizontally at full length, and the middle one upright; the tree having produced a

further supply of shoots in the following year, add two or four of them as side branches, arranging them on each side of the stem as the two former, training the middle shoot still in an upright direction; observing that where it does not furnish horizontals low enough, it may be shortened so as to make it throw out shoots at any requisite height, continuing the middle one always upward for a stem, and the side ones for bearers.

In either of these methods of training the trees, continue yearly increasing the number of horizontal shoots, till the full space of walling or espalier is regularly covered with bearers at equal distances, constantly continuing them all at full length, as far as the scope of walling, &c. will permit; as they naturally form fruit-spurs at every eye, almost their whole length, and the same branches continue in a fruitful state a great length of time.

When the trees have once filled the wall or espalier with branches, they need but very little further supply for many years, and that only occasionally, according as any worn-out or decayed branch occurs, and wants renewing with young wood. See PRUNING.

In the after-prunings in the summer, which should be begun in May, or early in June, rub off all the superfluous and unnecessary shoots of the year, and all fore-right and other ill-placed shoots, retrenching them quite close, being careful to leave the terminating shoot of every horizontal or bearer entire; and reserving here and there a well-placed shoot towards the lower parts in particular, and where there are any apparent vacancies, to train up between the mother branches, till winter pruning, when if not wanted they must be retrenched.

In the winter pruning, which may be performed any time from the fall of the leaf until March, the branches should be generally examined to see if they are any where too much crowded, or trained irregularly; and where any such occur, they should be regulated as they may require; and where there are any vacancies, some contiguous shoots, reserved in the summer dressing, should be laid in, and all the other shoots not wanted must be cut clean out close to the branches, being careful still to preserve the terminating shoot of every branch entire, in all parts, as far as the allotted space admits, likewise all the fruit-spurs in every part, fastening in all the branches regularly at full length.

In pruning old trees at this season, where decayed and worn-out branches occur, they should be cut out, and young wood trained in its stead; likewise, where any branch, through age or any other defect, is become barren or worn out, it should be retrenched, and some eligible lower young branch or shoot be laid in in its place.

Where any of the choicer sorts of these trees are become worn out and barren, they should be renewed with young bearers, by heading the branches wholly down near the bottom in winter or spring, when they break out in the old wood, and in the following summer furnish a large supply of strong young shoots, which should be trained according to the rules already laid down, when they will soon form a sort of new tree, and bear good fruit.

After each winter-pruning, the trees which are against walls and espaliers require a general nailing, &c., which should always be done with great regularity. See WALL-TREES, and ESPALIER-TREES.

The mode of training dwarf standard trees of this sort is shown in speaking of trees of that kind. See DWARF TREES.

In respect to the culture of the borders where this sort of wall- or espalier-trees are growing, it is commonly digging them once every year, adding manure occasionally in common with the other parts of the garden; but if some good rotten dung be applied every other year, and the ground well dug or trenched every winter, it greatly promotes the size and perfection of the fruit.

In regard to standard-trees of this kind, any of the sorts bear plentifully in any open situation, though the fruit may not always be so large and fine as those of wall- and espalier-trees: summer and autumn pears however ripen in great perfection on standards, as also most of the common winter pears. In planting them, trees of from two or three to four or five years old, having tolerable heads, are of a proper age and size for the purpose, and are preferable to older trees for any general plantation. They should be planted with all their heads entire, except retrenching any very irregular-placed branch, in the usual manner of tree-planting. See PLANTING.

In their future growth they should be suffered to branch naturally, so as to form large branchy heads, suffering them all to remain entire.

The general culture of this sort of trees, in respect to pruning, is very trifling, and only required occasionally, probably only once in several years; such as the retrenching any irregular growing branches, and thinning such branches as are very much crowded, cutting out all decayed wood, and eradicating suckers from the roots and stems. See PRUNING.

Where standard-trees are situated in a garden, in which the ground is necessarily dug over and

trenched annually for the reception of the under-crops, and occasionally enriched with dung, they generally produce finer fruit than in orchards, or other places where the ground is not in similar culture.

Mr. Forsyth observes that "the method of pruning pear-trees is very different from that practised for apple-trees in general, in which the constant practice has been to leave great spurs as big as a man's arm, standing out from the walls from one foot to eighteen inches and upwards." The constant pruning, he says, "inevitably brings on the canker; and, by the spurs standing out so far from the wall, the blossom and fruit are liable to be much injured by the frost and blighting winds, and thus the sap will not have a free circulation all over the tree. The sap will always find its way first to the extremities of the shoots; and the spurs will only receive it in a small proportion, as it returns from the ends of the branches; and the fruit standing at so great a distance from the wall is too much exposed to the weather, and, of course, is liable to be hard, spotted and kernelly."

The following method, he says, he has practised where the trees were all over cankered, and the fruit small, and not fit to be sent to the table. "He cut the tops off as near as possible to where they were grafted, always observing to cut as close to a joint or bud as possible. The buds are hardly perceptible, but it canalways, he says, be known where the joints, or forks, are, by the branches breaking out of the sides."

He adds, that "finding the pear-trees in Kensington Gardens in a very cankery and unfruitful state, in the years 1784 and 5, he took out the old mould from the borders against the walls, and put in fresh loam in its stead; at the same time he pruned and nailed the trees in the common way, and left them in that state upwards of eighteen months, to see what effect the fresh mould would have on them; but, to his great surprise, he found that it had no good effect."

After this trial he began to consider what should be done in order to recover these old trees. In this attempt he "began with cutting down four old and decayed pear-trees of different kinds, near to the place where they had been grafted: this operation was performed on the 15th of May, 1786. Finding that they put forth fine shoots, he headed down four more on the 20th of June in the same year (for by this time the former had shoots of a foot long), which did equally well, and bore some fruit in the following year. One of the first four that he headed down was a St. Germain, which produced nineteen fine large well-flavoured pears next year, and in the third bore more fruit than it did in its former state when it was four times the size. He left seven trees upon an east wall, treated according to the common method of pruning, which bore the following number of pears upon each tree: Epine d'Hyver produced eighty-six pears, and the tree spread fifteen yards; a Crasane produced one hundred pears, and the tree spread fourteen yards; another Crasane produced sixteen pears, and the tree spread ten yards: a Virgoleuse produced one hundred and fifty pears, and the tree spread nine yards; a Colmar produced one hundred and fifty pears, and the tree spread nine yards; another Colmar produced seventy nine pears, and the tree spread ten yards; a L'Eschasserie produced sixty pears.

"But seven trees headed down and pruned according to his own method, leaving the fore-right shoots in summer, bore, he says, as follows, in the fourth year after heading:—a Louisbonne bore four hundred and sixty-three pears, and the tree spread nine yards; another Louisbonne bore three hundred and ninety-one pears, and spread eight yards; a Colmar bore two hundred and thirteen pears, and spread six yards; a Brown Beurré bore five hundred and three pears; another Brown Beurré bore five hundred and fifty pears; a Crasane bore five hundred and twenty pears; a Virgouleuse bore five hundred and eighty pears. And he adds that the branches of the four last trees spread nearly in the same proportion as the first three. He also states that a young Beurré, the second year after heading, bore two hundred and thirty pears; and a St. Germain four hundred. All the above trees stood in the same aspect and the same wall, and the fruit was numbered in the same year. A great many pears which dropped from the trees are not reckoned. The trees that were pruned according to the old practice covered at least one-third more wall than the other.

From this statement it appears, he says, that the trees headed down bore upwards of five times the quantity of fruit that the others did; and that it keeps increasing in proportion to the progress of the trees. This is an important statement in the culture and management of old trees of this sort; and the following fact with respect to standards is deserving of great attention:—

"On the 20th of June he headed several standards that were almost destroyed by the canker; some of them were so loaded with fruit the following year, that he was obliged to prop the branches, to prevent their being broken down by the weight of it. In the fourth year after these standards were headed down, one of them bore two thousand eight hundred and forty pears. There were three standards on the same

border with the above, two of which were St. Germains; the old tree was of the same kind. One of these trees, twenty years old, had five hundred pears on it, which was a great crop for its size: so that there were on the old tree, which had been headed down not quite four years, two thousand three hundred and forty pears more than on the tree of twenty years growth. When the men numbered the pears, there was, he says, near a barrowful of wind-falls at the bottom of the old tree, which were not included.

These and other statements are given in his useful Treatise on the Culture of Fruit-Trees.

The following is the method which he pursues in training trees that are cut near to the place where they were grafted:—

"In the month of March, every year, he shortens the leading shoot to a foot or eighteen inches, according to its strength: this shoot will, he says, if the tree be strong, grow from five to seven feet long in one season; and, if left to nature, would run up without throwing out side-shoots. The reason for thus shortening the leading shoot is, he says, to make it throw out side-shoots; and if it be done close to a bud, it will frequently cover the cut in one season, leaving only a cicatrix. When the shoots are very strong, he cuts the leading ones twice in one season; by this method he gets two sets of side-shoots in one year, which enable him the sooner to cover the wall. The first cutting is performed any time during the spring, and the second about the middle of June. When you prune the trees, and cut the foreright shoots, which should be done in February or March, always cut close to an eye or bud, observing where you see the greatest number of leaves at the lower bud, and cut at them; for at the footstalk of every one of these will be produced a flower-bud. The same will hold good in cutting the superfluous shoots on standard pears." He adds, that "you will have in some sorts of pears, in a favourable season, from five to nine pears in a cluster. This cutting should not be later than March, or the beginning of April, on account of the leading shoot beginning to grow: the next topping, when the leading shoot grows quick enough to admit of it, should be about the middle of June; and the length of the shoots should be according to their strength, having from three eyes, or buds, to fix on a side."

It is added that "the cankery part beginning to affect the new bark, he cut off all the canker at the bottom, and plastered the place with some cow-dung, mixed with wood-ashes and powder of burnt bones, put into as much urine and soapsuds as would make it of the consistence of thick paint; this he laid on with a painter's brush. After it had been applied about three hours, he patted it gently down, with his hand, close to the tree. By so doing, he gets rid, he says, of all the air-bubbles that may be under the Composition, and makes it adhere to the tree, preventing it from being washed off by heavy rains. And in the beginning of August he shortens the foreright shoots to about four inches long; by this time the shoot will have made its full growth for the season, and will produce fine strong eyes for the following year. Such shoots as grow near the stem of the tree, if any are wanted to fill up the wall, may, he says, be tucked-in as directed for peaches. This will prevent them from looking unsightly, and save them from the fury of the autumnal and winter winds."

He further advises, that "whenever the trunk is hollow, it be followed under ground till you have cut out all the decayed parts and rotten roots, otherwise you will lose the tree. By proceeding according to the foregoing directions, the root will, he says, be renewed, while the tree is forming a fine handsome head. In the mean-time the borders should be trenched, taking up all the old roots, and adding some fresh mould to them, if you can conveniently get it; if you cannot, remove all the sour mould that is about the roots of the trees, and put in some taken from the border, at a distance from the wall; always remembering to lay the top spit next to the roots of the trees; also, to mix some vegetable mould, from the melon and cucumber beds, with rotten leaves, as a manure for the borders."

He has "headed down, he says, many trees that had not this preparation; and yet they throve very well, but did not send forth such fine roots and shoots as those that were so prepared."

He concludes by observing, that "if the above directions be followed, more pears will be procured in three or four years than can be done in twenty-five years by planting young trees, and pruning and managing them in the common way. It is added, that if it should be found, that, before the pears arrive at half their natural size, they get stunted, after cold blighting winds, and frosty nights, he would recommend a new operation to be performed when the weather begins to grow mild, which is to take a sharp penknife, and with the point of it make an incision through the rind of the pear from the footstalk to the eye, in the same way as in scarifying a bark-bound tree, taking care to penetrate as little into the flesh of the pear as possible. At the same time beat up some fresh

cow-dung with wood-ashes, and with your fore-finger rub in a little of this Composition where you made the scarification; as the wound heals, the Composition will be discharged from the fruit; this will prevent the pears from cracking and bursting, which renders them good for nothing. The sorts that are most liable to this disorder are, he observes, the Colmar, Virgouleuse, and Crasane. He only, however, recommends this operation for wall pears, as it may be thought by some a troublesome operation, and it will certainly take up some time."

The maturity of the pear is generally known by its changing from a green to a yellow or reddish colour, &c., and by the frequent falling from the tree, and when with a gentle twist or turn upwards, it easily quits its hold; but these signs of ripeness are more particularly observable in Summer and Autumn pears; as Winter pears not being maturely ripe when gathered, often require a good pull before they quit the branches.

The Summer pears ripen in succession in different sorts, from about the beginning or middle of July till the middle of September; many of the earliest ripening all at once, as it were, and continuing good but a few days, either on the tree or when gathered, nor will any of the sorts keep good long; and none of these sorts should hang on the tree till soft ripe, as in that case most of them would be mealy and insipid. These sorts should be gathered as soon as they are arrived to full growth, and just begin to colour and discover maturity, but before they become soft and mellow. For family use, they may be gathered from the tree according as they attain perfection: but the general crops of each sort should be always taken down before they ripen fully, and be laid in any dry room; none of the kinds will keep long, some only a few days, and scarcely any of them above a fortnight, though from different varieties ripening at different times, the succession is continued for eight or ten weeks.

The Autumn sorts ripen in different varieties, from about the middle of September till the end of October; some of the forwardest become eatable on the tree, others requiring to lie some time after being gathered before they acquire perfection. The different sorts of these pears should be gathered according as they arrive to maturity: those designed to keep some time, may be gathered in dry weather, just when they have attained full growth, as shown by their frequent dropping, and by their readily quitting the trees on being handled, and laid in a dry close room, or in baskets, each sort separately.

The Winter kinds attain their full growth on the trees about the end of October or beginning of November; but the eatable kinds do not acquire maturity for that purpose on the tree, or for some considerable time after they are gathered, some probably in a month, others two or three, and some more, and some sorts not till the spring following. But the baking kinds may be used any time from October or November during their continuance.

All Winter pears should be indulged with as full growth on the tree as the weather will permit, even until the end of October or first week in November in the later kinds, if the season continues mild: be cautious, however, to get them gathered before attacked by much frost. And in gathering all the sorts for keeping, dry weather should be chosen, and when the fruit is also quite dry, being careful not to bruise them. See FRUIT.

Forcing of Pears.—These sorts of trees are sometimes forced by artificial heat, in some of the prime early summer kinds, to obtain a portion of fruit as early in the season as possible. This is effected by means of hot-walls and forcing frames; having previously some trees of the choicest early summer pears, such as the Jargonelle, or any other early sort, trained as wall-trees against a south wall, till advanced to some tolerable state of bearing; being then inclosed with glass frames, in the manner of forcing-frames or hot-walls, and having internally either flues for fire heat, erected forward and extending long-ways, or otherwise a pit arranged in that direction, in the interval space between the trees and the glass-work, for a bark or dung hot-bed; and by one or other of these methods a proper degree of artificial heat is produced internally to force an early growth in the trees, and forward them to early flowering and fruiting, managing them in the common way, as other trees in forcing-frames, so as to have some ripe fruit early in June, or some time in that month.

Culture in the Apple Kind.—The whole of the varieties of the apple were first accidentally obtained by raising them from the kernels of the fruit; but as these cannot be depended upon to continue the same sort of fruit, grafting is the mode made use of to increase and continue the different varieties of them, which is performed upon Crab, or any kind of Apple stocks, raised from the kernels, for dwarfs as well as standards: and sometimes upon Codlin and Paradise Apple stocks raised from cuttings and layers, when designed to have espaliers and other dwarf trees, or for small standards, as low as possible, to be confined within a moderate space: some sorts may also be raised by layers and cuttings, as the common Codlin.

The method of raising the different sorts of stocks for the purpose is, in the Crab and Apple stocks from the kernels of the fruit; but in the Codlin and Paradise stocks by cuttings and layers, to continue them with certainty of the same kinds and moderate growths. The Crab and Apple stocks may be raised from the kernels of any of the sorts, procuring them in autumn or winter, either from the fruit, or from such as have been pressed for verjuice and cider, clearing them from the grossest of the pulp; then sowing them in beds of light earth, moderately thick, over the bed, or in drills, covering them about an inch deep. They come up in the spring; when, if the season prove dry, they should be watered occasionally, to forward and strengthen the growth of the plants; and in the autumn, winter, or spring following, the largest may be planted out in nursery-rows, shortening their tap-roots a little, and placing them in lines two feet and a half asunder, to remain for grafting: after having from one to two or three years' growth, they will be fit for grafting upon, particularly for dwarfs, or even for full and half standards, if intended to form the stem from the graft, which is an eligible method for these trees; but if the stock is to form the stem, they require three or four years' growth, to rise to a proper height, seven feet for full, and four or five for half standards. The modes of grafting all the sorts is the same as for other fruit-trees, and should be performed in March, either by whip- or cleft-grafting, according to the size of the stock. See GRAFTING.

Having provided proper grafts of the different sorts of apples intended to be raised, the stocks designed for dwarfs of all sorts must be grafted within six inches of the ground; and the standards may also be grafted low, one shoot from the graft being trained up for a stem, or on tall stocks, at five or six feet in height, but for low and half standards, at two or three, to four or five feet, and lower for dwarf standards. The grafts of all the sorts shoot the same year; and by the autumn following, the trees having formed little heads, consisting of two, three or four shoots, may then be planted out finally where they are to remain, or be retained a year or two, or longer, in the nursery, as may be requisite, training them for the purposes intended, as dwarfs, espaliers, &c., &c., and uprights for standards, heading the dwarfs down in March following, within six inches of the graft, to force out more lateral shoots below to form a fuller head, proceeding immediately to turn them near the bottom, so as to fill the espalier, &c., equally with branches, quite from within six or eight inches of the ground, regularly upward. In the standards, those grafted low must be trained with one shoot upright, at full length, for a stem, five or six feet high at least, for full standards, before it is topped; though if grafted on tall stocks of height sufficient for a stem, the shoots from the graft may either be headed to five or six eyes; or, if to form a more spreading head, remain entire, and aspire more in height, and assume a more upright growth: in all the modes of training, care should be taken to keep the stems clear from all lateral shoots, displacing all such as soon as they appear, encouraging only a proper set of branches at top to form the head.

When these trees have heads from one to two or three years old from the graft, they are of a proper age for final planting out; though trees of four or five years old will also succeed very well, and even those of six or eight years' growth may also be safely planted if required.

The nursery-grounds are mostly furnished with all the varieties of these trees for sale, either quite young from the graft, or trained of several years' growth.

In choosing the different kinds of trees for planting, care should be taken to have a collection of the principal varieties, both in espaliers and standards, in proportion to the extent of ground, as the trees of the best sorts are as easily raised and cultivated as the indifferent ones, allotting a smaller portion of the summer kinds, as such as ripen from August to about the middle of September, for immediate use off the trees, as they will not keep long; a larger supply of the autumn sorts, and most of all of the principal winter keeping apples: observing, in the summer kinds, that it is advisable to allot a principal supply of the common Codlin in small standards, as being generally both a great bearer, and the fruit the most useful of the summer apples for culinary purposes, from its young green growth in June or July, till its full maturity in August and September, when it becomes also a good eating apple: and as the tree is a moderate grower, it admits of being planted in small standards closer or more abundant in a small extent of ground than most of the principal apple kinds.

In choosing apple-trees from the nursery, they should, Mr. Forsyth says, have strong, straight, and clean stems. And he advises not to suffer the dwarf-trees to run higher than twelve feet, as otherwise they become naked at bottom, the fruit is liable to be blown down, and the tops broken by high winds.

The proper season for planting all the sorts of apples is in mild weather, from the end of October till March; but when planted in autumn,

or early in winter, they establish themselves more firmly before the drought of the following summer.

They succeed in any common soil and open situation, except in low very moist land, in which they are apt to canker, and soon go off: in a pliable mellow loam they generally answer very well. The ground should be properly prepared, by good trenching, where the ranges of trees are to stand.

In the planting of Espalier Apple-trees they should be ranged at not less than eighteen or twenty feet distance; the latter especially for trees grafted on Crab or Apple stocks, which being free shooters, the branches readily fill that space. For the trees grafted on Codlin and Paradise stocks, fifteen or eighteen feet may be sufficient; though the latter, in particular, is sometimes planted only twelve or fifteen feet asunder, as being a very moderate shooter: it is, however, advisable to allow every sort full room, according to their growth, to have proper space to extend their branches always at full length. The trees should be planted with all their heads entire, only retrenching any very irregular growths, that do not range consistently with the intended form, and pruning any broken roots. Then having opened a proper hole for each tree, plant them in the usual manner, being careful to place them with their branches ranging the way of the espalier. As soon as the earth of the holes and of the roots is properly settled, all the branches should be trained in horizontally to the right and left, an equal number on each side, at full length, as above.

The general culture in espalier trees thus planted and trained, as the same branches or bearers continue fruitful many years, is to continue them as long as they remain of proper growths, constantly giving them a summer and winter pruning annually, as explained above.

In wall-trees also, any of the principal choice varieties of eating-apples may be trained, to forward and improve the growth, beauty, and flavour of the fruit; such as Jennetings, Margaret-apple, Golden-pippins, Golden-rennets, Pearmains, &c., or any other approved eating kinds, a tree or two of a sort, against a south or south-west or east wall.

Standard apples when planted in the garden should be arranged thinly, to admit of under-crops growing freely, without being shaded by their spreading branches.

Full standards should be chiefly planted for the general crops, and half and dwarf standards for variety.

The standards, when trained as above, should be planted out with all their heads entire, when in the kitchen garden, at thirty feet distance in the rows; and for an orchard thirty feet distance every way. In planting, for each tree a wide hole should be opened, trimming any long straggling and broken roots, leaving all the others entire, and planting them with the usual care. As soon as planted out, every tree should be well staked to support them firmly upright, and prevent their being disturbed in rooting by winds. See ORCHARD and PLANTING.

Smaller growing standards, such as Codlins, or other low standards grafted upon Codlin stocks, and dwarfs upon these or Paradise stocks, may, if required, be planted only at fifteen or twenty feet distance in the rows, and not less than twenty or twenty-five feet between the lines of trees; though, if there be room to allow a greater distance both ways, it will be advantageous, especially in planting in kitchen gardens, in which it would be proper to allow double that distance between the rows of trees, of the larger growths of these kinds.

The standards thus planted with their heads entire, should be suffered to advance with their branches at full length, and in general take their natural growth, when they soon form numerous natural spurs in every part for bearing.

In respect to pruning these standards, little is required, only the occasional retrenching any very irregular cross-placed bough, or the reducing to order any very long rambler; or when the head is become greatly crowded and confused, to thin out some of the most irregular growths, likewise all strong shoots growing upright in the middle of the head, and all dead wood, and suckers from the stem and root.

As to half and dwarf standards of these trees, they may be dispersed in different parts of the garden to cause variety, managing them as the full standards.

The former on dwarf Paradise stocks, being very moderate shooters, may be planted in a little compass; and are sometimes planted in pots for curiosity, to place on a table, amidst a dessert, with the fruit growing on them. See DWARF TREES.

It is observed by Mr. Forsyth, that "in heading down old decayed apple-trees, for the sake of symmetry, it will be necessary to cut at the forked branch as near as can be to the upper side of the fork, cutting them in a sloping manner to carry off the wet, at the same time rounding the edges. To begin at the lower branches, cutting just above the lower fork; and proceeding upwards, cutting the rest of the branches from one to six joints, or forks, according to their strength, till you have finished cutting-in the whole head. If any of these branches should have the canker,

all the infected part must, he says, be cut out. When the tree is all prepared, the Composition should be immediately applied, beginning at the top of the tree, and finishing with the powder of wood-ashes and burnt bones as you descend, which will save it from being rubbed off during the operation; and the Composition will prevent the sun and air from injuring the naked inner bark. A tree thus prepared, will, he adds, in the course of three or four years, produce more and finer fruit than a maiden tree that has been planted upwards of twenty years."

These directions, if properly attended to, will be sufficient, he thinks, to enable any one to bring old decayed trees into a healthy bearing state.

He supposes, that in large orchards and gardens, it may be necessary, at first, to head down only every other tree; cutting some of the branches of the rest, which are in a decayed and cankery state, and which bear no fruit. This will, he says, be preparing them to throw out new wood, and furnish the tree much sooner with bearing branches. He recommends the performing the operation as early as possible; as by so doing the wood will be the stronger, as in May, or the two following months.

He adds, that when the trees are become hollow, the same method should be followed as directed for plums; but by no means to cut them down unless the tops are quite decayed; observing to cut the loose rotten wood clean out of the hollow and other decayed parts, applying the Composition; at the same time to open the ground, and cut out all the rotten parts that may be found in the lower part of the stem, together with all the decayed roots, which, if this be not done, will infallibly injure the fresh wood and bark, and prevent a cure from being effected. He would recommend heading down all apple-trees that are much cankered and have ill-shaped heads; as by so doing much labour will be saved, and the trees will amply pay the proprietor. He advises never to shorten the young branches, except they are very thin, when it will be necessary to do so to fill the trees with young wood: nor prune any of the young shoots the second year (he means the year after they are cut), as many of the eyes, almost to the end of the shoot, will, if it be strong, become fruit-buds next year; and so on every year. He says, that in the month of May in the first year after the trees have been so cut, it will be necessary to go over them, and rub off with your finger and thumb all the superfluous young shoots; leaving from three to six eyes on each shoot, according to the size and strength of the branch cut. These shoots will bear from three to four years; by which time they will be pretty much exhausted by the great quantity of fruit produced from them: they should then be cut down to two eyes to produce new wood. He always leaves three different years' branches on the tree, when the first shoot is cut off. This is fully shown in a plate in his useful work; and the next shoot will be full of fruit-buds, if it has not been shortened: when it begins to grow weak, it should be cut off; and the next cutting must be made when the former branch is tired of bearing: by proceeding thus all over the tree with care and attention, the advantages of this method of pruning, above the common mode, will, he says, soon be perceived; as by it you will be able to keep the trees in a constant state of bearing, which, if left to nature, would only produce a crop of fruit once in two or three years. When the shoot that has done bearing is cut off, the Composition should constantly be applied, rubbing off the shoots where they are too numerous.

He thinks the best time to prune apple-trees is in the month of April, or in May, after the operation has been performed on the peaches, nectarines, and cherries: and that soon after this pruning, about the middle of May, it will be proper to look over the trees, and to pick off any caterpillars that may be on them. It will then be seen what shoots are infected with the canker, and which might have escaped your notice at the time of pruning; and wherever you observe the least appearance of infection, which may be known by the wood appearing of a brownish colour, the shoot must be cut down till you come to the sound white wood.

The small shoots that cross each other should be cut off, leaving the strongest to fill up the tree, and make a fine handsome head. The suckers that spring from the root should be carefully grubbed up, and the side-shoots from the stem cut off; for, if left to grow, they greatly weaken the tree. The knobs, where old branches have been cut off, should also be pared away, leaving the surface of the tree as smooth as possible: after which, the Composition should be applied: the young bark will soon, he says, begin to grow, and by degrees cover the old wounds with a fresh smooth surface, and thus prevent the canker from gaining ground on the tree. He has seen some old wounds of considerable size healed over in one year: and he adds, in confirmation of the utility of this practice, that "the trees which he pruned and dressed, as above directed, in the course of the summer, 1795, are all perfectly cured, the wounds being filled up with sound wood, and covered over with new bark: they all continue in a healthy state, and bear fine handsome fruit." And he has advised several nurserymen to follow the practice, head-

ing down their apple-trees after the season of drawing for sale is over. Messrs. Gray and Wear have headed a great many of such trees as were formerly thrown to the faggot-pile, and have been amply recompensed for their trouble. Trees thus headed down, provided the stems be strong, will, he thinks, in the first and second year, produce as much fruit as will refund the purchase-money; besides, a great deal of time will be saved, which would be lost by planting younger trees: as, where you can procure trees of the above description that have been headed down three or more years, they will be all covered with fruit-buds; and, if carefully taken up and planted in the autumn, if the season proves favourable, they will have a tolerable crop of fruit the first year. Such trees must not be headed down like maiden-trees, but only thinned off where the branches run across and rub against one another, which should never be suffered in these cases.

He says, he would never recommend training apple-trees as espaliers; as by doing so the air is kept from the quarters of the garden; and by constant pruning and cutting off all the side-shoots which you cannot tie to the espaliers, you prevent them from bearing, and, moreover, bring on the canker.

And when the dwarf trees have handsome heads, more and much finer fruit will be gotten, he says, from one of them than from six espaliers; at the same time, a free air is admitted to the crops in the quarters, and the constant expense of stakes and labour, in laying the trees to the espaliers is saved. Espaliers may, he observes, be converted into dwarf standards by shortening the branches at different lengths, so as that they may be able to support themselves without the stakes; but not to shorten them all regularly; and if cut with judgment, as near to a leading shoot, or an eye, as possible, they will in the course of two years form fine heads, and in the third year bear six times as much fruit as they did in their former state, and of a finer flavour. The same method of pruning as already laid down for standard apple-trees is also applicable to espaliers.

He observes, that "the borders where you make your crossings in gardens should be six or eight feet broad at least, to let the trees spread on each side, at the distance of twelve feet from tree to tree, and they should be well trenched, two feet and a half deep at least. If there should be gravel, or sour clay, it must be taken out, and good mould put in its place; leaving the ground as rough as possible for the frost and rain to mellow it. When you level the ground it should be done after rain: you may then sow some small crops in the borders; such as lettuce or spinach, or cabbage for transplanting; but let not any of the Brassica tribe come to full growth. Leaving cabbage and brocoli on borders, near fruit-trees, draws the ground very much, fills the borders with insects, and also prevents the sun and air from penetrating into the ground. And when the sun can have free access to the border, it adds much to the flavour of the fruit. If you can spare the ground on the cross-borders in winter, it will be of great service to the trees to ridge it up as loose as you can, and let it lie in that state all winter, to mellow and sweeten.

Where the soil is strong, he would recommend planting of apple-trees that are grafted on Paradise stocks; but if the soil be light, free stocks will do much better: and when the ground is a strong clay or brick-earth, it should be mixed with old lime-rubbish or coal-ashes, street-dung, or sand: but what he uses for the borders against the walls, and which he prefers to every other manure, is a vegetable mould produced from leaves of trees.

Of this a good coat should be given once in two or three years, which will be sufficient, he thinks, for the borders where the wall-trees stand, and much better than dung, which he by no means approves of for trees, unless it be perfectly rotten and mixed up with mould.

In respect to grafting old apple-trees, he says, "it frequently happens, that, through some mistake or other, after waiting ten or twelve years for a tree to come into a bearing state, it is found that the fruit is neither fit for the table nor kitchen; in such cases they should always be grafted the following spring, observing to graft on the finest and healthiest shoots, and as near as possible to the old graft, and where the cross-shoots break out; as by so doing you will have some fruit the second year; and in the third, if properly managed, you will have as much as on a maiden-tree of fifteen years standing: the canker, if any, must be carefully pared off the branch, and the scion must be taken from a sound healthy tree. Whenever an incision is made for budding or grafting, from that moment the canker, he says, begins. He would, therefore, recommend to those employed in budding or grafting, as soon as the incision is made, and the bud or graft inserted, to rub in with the finger, or a brush, some of the Composition before the bass is tied on; then to cover the bass all over with the Composition as thick as it can be laid on with a brush, working it well in. If this operation be performed in a proper manner, and in a moist season, it will answer every purpose, he says, without applying any grafting-clay: as he has frequently done it, and found it

succeed perfectly to his wishes. The matting which is wrapped round the bud should not be slackened too soon; for in that case you will find the incision opened, which very often occasions the death of the bud. If, says he, nurserymen and gardeners would give this method a fair trial, and use the same composition as he uses for curing defects in trees, instead of loam and horse dung (which bind so hard as to prevent the rain and moisture from penetrating to the graft to moisten the wood and bark), they would find that the grafts would succeed much better. The composition, for this purpose, should, he says, be rather softer than grafting-clay generally is; and, instead of applying so large a mass as is generally done of clay, it need not, in most cases, be more than two or three inches in circumference, to effect the purpose.

Apples come to full growth in different sorts successively, from July until the end of October: the summer kinds continue but a short time, but the autumn- and winter-apples keep from two or three to six or eight months, in different varieties. The signs of perfection or full growth of the different sorts of apples, are by their assuming a lively colour, emitting a fragrant odour, frequently falling from the tree, and by quitting their hold easily on being handled.

In the gathering of all the sorts of apples for keeping, dry weather should always be chosen, and when the trees and fruit are also perfectly dry: observe likewise in gathering apples for the table, and all kinds of apples designed for keeping any considerable time, that they be pulled one and one by hand. See FRUIT.

The other species may be increased by grafting and budding them upon the common Crab stock: they should have sheltered situations, as they are rather tender while young. These trees afford ornament and variety in the clumps and shrubbery parts of pleasure-grounds.

Culture in the Quince Kind.—These trees may be raised from the kernels of the fruit sown in autumn; but there is no depending on having the same sort of good fruit from seedlings, nor will they soon become bearers. But the several varieties may be continued the same by cuttings and layers; also by suckers from such trees as grow upon their own roots, and likewise be increased by grafting and budding upon their own or Pear-stocks raised from the kernels in the same manner as for apples.

The raising by cuttings, layers, and suckers is performed in autumn, winter, or spring, choosing young wood for the cuttings and layers, which should be planted and laid in the common method, when they will be rooted by the following autumn, then planted out into nursery rows two feet asunder; plant the suckers also at the same distance, and there training the whole for the purposes intended: if for standards, run them up with a stem to any desired height, from three to five or six feet, then encourage them to branch out at top, to form a head; and those designed as dwarfs must be headed near the ground, and trained accordingly for espaliers, or dwarf standards, as directed under those articles: the grafting or budding is effected on Quince- or Pear-stocks, and trained as above.

When they have formed tolerable heads, they should be planted out finally.

Mr. Forsyth advises that the layers or cuttings should be planted in a shady place, in rows at about a foot distant from each other, and about three inches from plant to plant in the rows; mulching them with rotten leaves, or rotten dung, which will keep the ground about them moist; and watering them frequently in hot weather. About Michaelmas those that are well rooted may be planted out, and those that are not should remain another year. They may also be propagated by budding or grafting; and these trees will bear sooner, and be more fruitful than those raised by any other method.

He observes, that the quince-tree may be pruned much in the same way as an apple-tree, taking care to cut out all the old diseased and dead wood, and the cross branches in the middle of the tree, which are apt to injure each other by friction. In general you will find old trees much hurt by injudicious pruning: in that case they should be headed down, cutting out all the cankery parts, and also all the diseased and dead wood where the tree is hollow, or where large branches have been cut or broken off; applying the composition as for apple-trees: and as quince-trees are very apt to have rough bark, and to be bark-bound, in these cases it will be necessary to shave off the rough bark with a draw-knife, and to scarify them when bark-bound, brushing them over with the composition.

It is also advised to plant quince-trees at a proper distance from apples and pears, as bees and the wind may mix the farina, and occasion the apples or pears to degenerate.

Standard quinces, designed as fruit-trees, may be stationed in the garden or orchard, and some by the sides of any water, pond, watery-ditch, &c. as they delight in moisture, suffering the whole to take their own natural growth: and as espaliers, they may be arranged in assemblage with other moderate-growing trees, such as apples and pears on paradise and quince-stocks, cherries, &c. being trained as directed for apples and pears in espaliers. They may also be planted in shrubberies either as full or low standards, and permitted to take their own way of growth. See ORCHARD.

QUEEN'S GILLIFLOWERS. See HESPERIS.

QUERCUS, a genus furnishing plants of the forest deciduous evergreen ornamental tree-kinds.

It belongs to the class and order *Monoecia Polyandria, (Enneandria Monogynia, Octandria Tetragynia)*, and ranks in the natural order of *Amentaceæ*.

The characters are: that in the male flowers the calyx is a filiform ament, long, loose: perianth one-leafed, subquinquefid: segments acute, often bifid: there is no corolla: the stamina have from five to ten filaments, very short: anthers large, twin; females sessile in the bud, on the same plant with the males: the calyx is an involucre, consisting of very many imbricate scales, united at the base into coriaceous hemispherical little cups; the outer ones larger, one-flowered; permanent: perianth very small, superior, six-cleft, permanent: segments acute, surrounding the base of the style, pressed close: there is no corolla: the pistillum is a very small germ, ovate, inferior, three-celled: rudiments of the seeds double: style simple, short, thicker at the base: stigmas three, reflex: there is no pericarpium: the seed is a nut (acorn) ovate-cylindrical, coriaceous, smooth, filed at the base, one-celled, fixed in a short hemispherical cup tubercled on the outside.

The species cultivated are:—1. *Q. Robur*, Common Oak Tree; 2. *Q. Phellos*, Willow-leaved Oak Tree; 3. *Q. Prinus*, Chestnut-leaved Oak Tree; 4. *Q. nigra*, Black Oak Tree; 5. *Q. rubra*, Red Oak Tree; 6. *Q. alba*, White Oak Tree; 7. *Q. esculus*, Italian or Small Prickly-cupped Oak Tree; 8. *Q. Ægilops*, Great Prickly-cupped Oak Tree; 9. *Q. Cerris*, Turkey Oak Tree; 10. *Q. Ilex*, Evergreen or Holm Oak Tree; 11. *Q. Gramuntia*, Holly-leaved Evergreen Oak Tree; 12. *Q. Suber*, Cork-barked Oak, or Cork Tree; 13. *Q. coccifera*, Kermes Oak Tree.

The first is well known, and attains a very great size, but slowly. In woods it rises to a very considerable height, but singly it is rather a spreading tree, sending off horizontally immense branches, which divide and subdivide very much. The trunk is covered with a very rugged brown bark. The leaves alternate, oblong, blunt, and broader towards the end; the edges deeply sinuate, forming obtuse or rounded lobes, dark green and shining above, paler underneath and finely netted, five inches or more in length, two and a half in breadth: they are deciduous, but often remain on the tree till the new buds are ready to burst. A native of Europe.

There are several varieties; as with the acorns on long peduncles. This is found in the wilds of Kent and Sussex, where there are many large trees. The leaves are not so deeply sinuated, nor are they so irregular, but the indentures are opposite; they have scarce any footstalks, but sit close to the branches: but the acorns stand upon very long footstalks. The timber of this sort is accounted better than that of the common oak, and the trees have a better appearance.

The Broad-leaved Evergreen Oak, which grows upon the Apennines, and also in Suabia and Portugal. The leaves are broader and not so deeply sinuated as those of the common oak; they are of a lighter green on their upper side, and pale on their under, have very short footstalks, and their points are obtuse; the acorns have very long footstalks, which frequently sustain three or four in a cluster.

The Dwarf Oak, which grows in the South of France and Italy, and is a low bushy oak, rises but six or seven feet high, sending out many slender branches the whole length. The leaves are oblong and obtusely indented, about three inches long, and an inch and half broad, standing upon slender footstalks; the acorns small, growing in clusters.

There are also many other varieties of common oak which dealers in timber and woodmen distinguish by their use, qualities, and accidents, and to which they give different names; but these being merely local, and not founded on permanent characters, it is difficult to ascertain them.

The second species grows naturally in North America, flowering in May and June. There they distinguish two sorts, one of which is called The Highland Willow Oak, and grows upon poor dry land; the leaves are of a pale green and entire, shaped like those of the willow tree. The acorns are very small, but have pretty large cups.

The other grows in low moist land, and rises to a much greater height: the leaves are larger and narrower, but the acorns are of the same size and shape. It is suggested, as probable, that their difference may be owing to the soil in which they grow. Martyn observes, that the latter becomes a large timber tree, and that there are said to be several varieties of it.

The third species has seemingly two varieties, one of which grows to a much larger tree than the other; but this may be occasioned by the soil, for the largest trees grow in rich low lands, where they become bigger than any of the North American Oaks. The wood is not of a very fine grain, but is very serviceable; the bark is gray and scaly; the leaves are five or six inches long, and two inches and a half broad in the middle, indented on the edges with many transverse veins running from the midrib to the

borders; they are of a bright green, and so nearly resemble those of the chestnut-tree as scarcely to be distinguished from it. The acorns are very large, and their cups are short. The leaves of the other variety are not so large, nor so strongly veined, and the acorns are smaller and a little longer. The different varieties are distinguished by the form of the leaves, which in the one is ovate and in the other oblong. It flowers here in May and June.

The fourth species grows on poor land in most parts of North America, where it never attains to a large size, and the wood is of little value. The bark is of a dark brown colour. The leaves are very broad at the top, where they have two waved indentures, which divide them almost into three lobes; they diminish gradually to their base, where they are narrow; they are smooth, of a lucid green, and have short footstalks. The acorns are smaller than those of the common oak, and have short cups.

The fifth arrives at a large size in North America, where it grows naturally. The bark is smooth, of a grayish colour, but that of the younger branches is darker. The leaves six inches long, two inches and a half broad in the middle, obtusely sinuate, each sinus ending in a bristly point, bright green, standing upon short footstalks: the leaves continue their verdure very late in autumn; so that unless hard frost comes on early, they do not fall till near Christmas, and do not even change their colour much sooner. The acorns are a little longer than those of the common oak, but not so thick. There are several varieties.

The sixth species is esteemed preferable in America to any of their other sorts for building, being much the most durable. The bark is grayish; the leaves are light green, six or seven inches long, and four broad; they are regularly cut almost to the midrib, and stand on short footstalks. The acorns greatly resemble those of the common Oak.

The seventh has the leaves smooth and deeply sinuated; some of the sinuses are obtuse, and others end in acute points; they are on very short footstalks: the branches are covered with a purplish bark when young: the acorns are long and slender; the cups rough and a little prickly, sitting close to the branches. These acorns are sweet, and frequently eaten by the poor in the South of France: in times of scarcity they grind them and make bread with the flour. It is a native of the South of Europe, flowering in May.

The eighth species is one of the fairest species of oak. The trunk rises as high as that of the common oak; the branches extend very wide on every side, and are covered with a grayish bark, intermixed with brown spots. The leaves are about three inches long, and almost two inches broad, deeply cut with most of the teeth turning back, and terminating in acute points; they are stiff, of a pale green on their upper side, and downy on their under. The acorns have very large scaly cups, which almost cover them; the scales are woody and pointed, standing out a quarter of an inch; some of the cups are as large as middling apples. A native of the Levant, whence the acorns are annually brought to Europe for dyeing.

The ninth has the leaves oblong and pointed, and frequently lyrate; they are jagged and acute-pointed, a little hoary on their underside, and stand on slender footstalks. The acorns are small, and have rough prickly cups. It is a native of the South of Europe.

There are several varieties.

The tenth species has several varieties, differing greatly in the size and shape of their leaves; but these will all arise from acorns of the same tree; even the lower and upper branches have very frequently leaves very different in size and shape, those on the lower branches being much broader, rounder, and their edges indented and set with prickles; but those on the upper long, narrow, and entire. The leaves are from three to four inches long, and an inch broad near the base, gradually lessening to a point; they are of a lucid green on their upper side, but whitish and downy on their under, stand upon pretty long footstalks, and do not fall till they are thrust off by young leaves in the spring. The acorns are smaller than those of the common oak, but of the same shape. It is a native of the South of Europe, Cochincina, and Barbary.

The eleventh is hardly a distinct species from the common Evergreen Oak. It is a native of the South of France, and flowers in June.

The twelfth species has two or three varieties; one with a broad leaf, a second with a narrow leaf, both evergreen; and one or two which cast their leaves in autumn; but the broad-leaved evergreen is the most common. The leaves of this are entire, about two inches long, and an inch and quarter broad, with a little down on their under sides, on very short footstalks: these leaves continue green through the winter till the middle of May, when they generally fall off just before the new leaves come out; so that the trees are often almost bare for a short time. The acorns are very like those of the common oak. It is a native of the South of Europe, Barbary, &c.

The exterior bark forms the cork, which is taken from the tree every eight or ten years; but there is an interior bark which nourishes them, so that stripping off the outer bark is so far from

injuring the trees, that it is necessary to continue them; for, when the bark is not taken off, they seldom last longer than fifty or sixty years in health; whereas trees which are barked every eight or ten years will live 150 years or more. The bark of a young tree is porous and good for little: however, it is necessary to take it off when the trees are twelve or fifteen years old, for without this the bark will never be good: after eight or ten years, the bark will be fit to take off again; but this second peeling is of little use: at the third peeling the bark will be in perfection, and will continue so for 150 years, as the best cork is taken from old trees. The time for stripping the bark is in July, when the second sap flows plentifully: the operation is performed with an instrument like that which is used for disbarking the oak.

The thirteenth is of small growth, seldom rising above twelve or fourteen feet high, sending out branches the whole length on every side, so as to form a bushy shrub: the leaves are armed with prickles like those of the holly; the acorns are smaller than those of the common oak. The leaves resemble those of the Ilex, but are less, thinner, and green on both sides. It is a native of the South of Europe, the Levant, Barbary, &c., flowering in May.

From this species they collect the Kermes or scarlet grain, a little red gall, occasioned by the puncture of an insect called *Coccus ilicis*. With this the antients used to dye cloth of a beautiful colour.

Culture.—These trees are all capable of being raised from the seed or acorns, which, in the common oak, should be gathered in autumn when quite ripe, just as they drop from the trees; but those of most of the foreign oaks are generally procured from abroad, and sold by the seedsmen.

All the sorts should be sown as soon after they are obtained as possible, as they are apt to sprout if they remain long out of the ground; and for their reception a spot of light ground in the nursery should be prepared by digging or ploughing, dividing it into four-feet-wide beds, in which the acorns should be sown, either in drills, two inches deep, in five or six rows, lengthwise of the bed: or rake the mould off the bed, the depth of two inches, into the alleys; then sowing the acorns all over the surface, about two or three inches apart, press them down with the spade, and spread the earth evenly over them two inches thick.

When they come up in the spring they should have occasional waterings and weeding; and when the plants are one or two years old, it is proper to plant them out in nursery-rows: this may be done in autumn, winter, or early in the spring, taking them carefully up out of the seed-bed, shortening their perpendicular tap-roots, and trimming off any lateral shoots from the stem, leaving their top perfectly entire; then planting them in lines two feet and a half asunder, and fifteen or eighteen inches in the rows, where they should stand, with the usual nursery care, till of a proper size for final planting out either as forest-trees, or for ornament, training them up as full standards, with clean straight stems, and with their tops still entire.

But in raising the striped-leaved varieties of the common oak, and any particular variety of the other species, it should be by grafting, (as they will not continue the same from seed,) which should be performed upon any kind of oakling stocks raised from the acorns, and trained for standards as in the other kinds.

With respect to the final planting out, it may be performed in all the sorts of deciduous oaks any time in open settled weather, from November till February or March, and in the evergreen kinds in October, November, or the spring; and in a mild open season in any of the winter months.

When the trees of all the sorts are from about three or four to six feet stature, they are proper for being planted out for good, though, as forest- or timber-trees, it is better to plant them out finally while they are quite young, as from two to three or four feet in height; or when planted immediately from the seed-bed, where they are to remain, it may be advantageous, as the very young oaks root more freely than older trees, and take a freer growth. Those designed as forest- or timber-trees, should be planted in large open tracts of ground to form woods, placing them in rows only four or five to ten feet asunder, and from two or three to five or six feet in the rows, to allow for a gradual thinning. See PLANTATION and PLANTING.

Sometimes large plantations of these trees, for woods, are raised by sowing the acorns at once in the places where they are to remain; it being generally found that the trees raised at once from the acorn, from their not being checked, much outstrip the transplanted trees in their growth. The method of performing it is this: the ground being prepared by good ploughing and harrowing, in the autumn, having procured a proper quantity of acorns, draw drills across the ground four feet asunder, and two inches deep, dropping the acorns into them six or eight inches asunder, allowing for failing and thinning, covering them in evenly with the earth the depth of the drills; or instead of drilling them in, they may be planted with a dibble, the same depth and distance.

The general management of these trees in woods or timber plantations is the same as

directed for forest-trees in general. See PLANTATION.

All the above sorts of trees may be employed to diversify large ornamental plantations in outgrounds, and in forming clumps in spacious lawns, parks, and other extensive open spaces: the evergreen kinds in particular have great merit for all ornamental purposes in pleasure-grounds and plantations. And all the larger growing kinds, both deciduous and evergreens, are highly valuable as forest-trees for timber; but the first sort claims precedence as a timber-tree, for its prodigious height and bulk, and superior worth of the wood.

In planting any of the species for ornament or variety in large pleasure-grounds, some may be disposed in assemblage in any continued plantation, some in clumps, and others singly.

QUICK, a term applied to signify any sort of young plant, but especially those of the white-thorn kind. By it is also often understood a live hedge, of whatever plants composed, in contradistinction to a dead hedge, but more properly the shrubs of which such live hedge is formed. In a strict sense it is however applied to the *Cratægus oxyacantha*, or Hawthorn, the young plants or sets of which are commonly sold by the nursery-gardeners under the name of Quick.

In the choice of these sets, those which are raised in the nursery are in general to be preferred to such as are drawn out of the woods, as the latter have seldom good roots: many persons, however, prefer them, as they are larger plants than are commonly to be had in the nursery. See CRATÆGUS.

QUINCUNX, in gardening, is a form of planting in which the trees are planted by fives, four of them forming a square, and the fifth placed in the middle,

* *
thus * and may be repeated over and
* *

over in one continued plantation, with as many trees in several ranges as may be proper. It was formerly a fashionable mode of planting groves and other regular plantations. It is seen more fully below:

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Something of this mode of arrangement has always a good effect in the disposition of shrubbery-plants, &c., though not in the regular order of it, but something nearly so, which gives the shrubs a greater scope of growth, and shows them to greater advantage. It is likewise a mode of planting that is proper in the kitchen-garden, in transplanting many kinds of esculent plants; such as lettuces, endive, strawberries, and even all the cabbage kinds, and many other plants, which gives them a greater scope to grow than if planted exactly square at the same distance from each other.

QUICKEN TREE. See SORBUS.

QUINCE TREE. See PYRUS CYDONIA.

RACER, a name applied to a sort of sward-cutter, or cutting implement used in racing out or cutting through the surface of grass sward, and dividing it into proper widths, lengths, and thickness, for turf intended to be cut up for laying in pleasure-grounds, and always necessary preparatory to the work of flaying or cutting up the turf with the turfing-iron. It is also useful for cutting and straightening the edges of grass verges in such grounds.

It is a simple tool, consisting of a strong wooden handle about four feet long, having the cutter fixed at the lower end in the form of a half moon with the edge downward, to cut into the sward; the handle should be about an inch and half thick, growing gradually thicker towards the lower end. See PLATE on IMPLEMENTS.

In using it is pushed forward so as to cut or race out the sward in an expeditious manner.

In cutting turfs with it, it is necessary first to mark out on the sward the width of the turf intended, which should generally be a foot wide and a yard long, and about an inch or inch and a half deep; then strain a line tight, first lengthways, striking the racer into the sward close to the line, running it along expeditiously so as to cut its way, and divide the sward to a proper depth, afterwards placing the line a foot further, and racing it out as before, and so on to as many

widths as may be wanted; and then with the line placed crossways, to race out the sward accordingly in yard lengths. The sward being thus raced out, the turf-cutter with the turfing-iron should proceed to cut them up, and flay them off. See TURF.

RADISH. See RAPHANUS.

RADISH, HORSE. See COCHLEARIA.

RAGGED ROBIN. See LYCHNIS.

RAGWORT. See SENECIO.

RAKE, GARDEN, a well known sort of tool for raking the ground, as well as for putting in seeds, &c. with. In order to suit every kind of gardening work with rakes, there should be three or four different sizes, from about six to eighteen inches long in the head, having handles from six to eight feet in length, and the heads toothed with iron teeth two or three inches long, being placed from one to two inches asunder, according to the respective sizes

The first or largest rake should have the head about fifteen to eighteen inches long, the teeth three inches, and placed two inches asunder, which is proper for raking stubborn or rough dug ground, and for putting in large kinds of seeds, raking off large weeds after hoeing, and many other purposes in large gardens.

The next size should have the head twelve inches long, the teeth three inches, being placed one inch and half asunder, which is proper for all common raking in ordinary light ground, and for raking in most kinds of small seeds, as well as other purposes.

A third sort of small rake should have the head about nine inches long, the teeth two and a half, being placed one inch asunder; proper for fine-raking beds, borders, &c., and raking in some particular fine seeds; as well as between rows, &c., of certain plants occasionally, where larger rakes cannot be introduced.

The smallest sort should have the head six inches long, the teeth two and a half, and placed one inch asunder; being very useful for raking between small plants in beds and borders and other small parts, where the plants stand close, as well as several other purposes of that kind.

These sorts of rakes are constructed both with wooden heads and iron teeth, and with the heads wholly of iron in both; of which the teeth are generally flattened, the back edge rounded off and narrowing gradually to the point, the other straight, and placed on the heads edge-ways across, with the back edge outward, and with the points all inclining very moderately inward, in a regular manner: the wooden-headed rakes having each end of the head hooped with a thin flat iron ring, to secure it from splitting.

The first sort are generally lightest and cheapest, being proper for any kind of garden raking; but the latter, or iron-headed rakes, when made neat, and as light as possible, with the teeth well set, in a proper position, and firmly fastened, are equally proper, and in some cases preferable, such as in wettish or moist soils, as not being liable to clog so much as wooden rakes, and more durable. They are, however, more proper for middling and small rakes, than for large ones; as, in strong raking, the teeth are more liable to get loose, than in the wooden-headed rakes.

Both the sorts, in their different sizes, are sold at the principal ironmongers' shops, both with and without handles.

Rakes having the heads, teeth, and handles, wholly of wood, are sometimes used for particular purposes; such as raking in light kinds of kitchen-garden seeds in light ground, and taking off large hoed-up weeds in wide clear spaces, raking up swarths of mowed short grass before the sweepers, also fallen leaves of trees in autumn, and clippings of hedges, &c., as well as several other uses.

RAKING, a necessary operation in gardening, to break the surface of the soil small, and render it fine for the reception of particular sorts of small seeds and plants previous to sowing and planting, as well as to render it neat and even.

It is also employed in raking in seeds, as being an expeditious mode of covering them in. In all kinds of small seeds of hardy plants, the ground being dug, &c., and the surface remaining rough after the spade, the seed is sown, and then raked in with an even hand, once or twice in a place, as a back and a fore stroke.

This operation is useful also among growing plants that stand distant enough to admit the rake, particularly where the surface is inclinable to bind; or where numerous small seed-weeds appear, as it loosens the soil, and retards the growth of the weeds, and promotes the growth of the young plants: it is also good culture at particular seasons, to annoy slugs, especially in kitchen gardens, to rake between the rows of small plants in autumn and winter, &c.

And raking the beds, borders, and other compartments of pleasure-grounds, now and then, smooth and even, gives an air of culture and neatness.

This sort of work should generally be performed in dry weather and when the ground is also moderately dry, as when done in rainy weather, or when the ground is very moist and cloggy, the surface is apt to cake and bind hard; this should be well attended to in sowing seeds. Rough dug ground does not rake well when it is

become very dry at top, especially if it was dug wet, and suffered to lie till the clods have become very dry and hard, in which case it will not rake well until mellowed or pulverised by a shower of rain. But common light garden ground generally rakes best when fresh dug, perhaps the same day, or day after at the furthest, before dried too much by the sun and wind, or rendered wet by rain, &c. The operation should, however, be performed when the ground is in such order as the clods will readily break and fall to pieces under the rake without clogging much thereto.

RAMPIONS. See CAMPANULA.

RAMSONS. See ALLIUM.

RANDIA. See GARDENIA.

RANUNCULUS, a genus containing plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Polyandria Polyginia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that the calyx is a five-leaved perianth: leaflets ovate, concave, coloured a little, deciduous: the corolla has five petals, blunt, shining, with small claws: the nectary a little cavity just above the claw, in each petal: the stamina have very many filaments, shorter by half than the corolla: anthers upright, oblong, blunt, twin: the pistillum has numerous germs, collected into a head: styles none: stigmas reflex, very small: there is no pericarpium: the receptacle connecting the seeds by very minute peduncles: the seeds very many, irregular, varying in figure, naked, with a reflex point.

The species cultivated are: 1. *R. Asiaticus*, Persian Crowfoot, or Garden Ranunculus; 2. *R. aconitifolius*, Aconite-leaved Crowfoot; 3. *R. acris*, Upright Meadow Crowfoot; 4. *R. repens*, Creeping Crowfoot; 5. *R. amplexicaulis*, Embracing-leaved Crowfoot.

There are other species that may be cultivated for variety.

The first has an upright branched stem, pubescent, round, as are also the peduncles: the lower leaves simple, lobed, gashed, acute, pubescent underneath, as are also the petioles: the root is composed of many thick fleshy fangs or fibres, uniting at top into a head; from these are sent forth many slender long fibres, striking deep in the ground: from the top arise several leaves, composed of three, six, or nine lobes of irregular forms, and cut at top into various segments; between these arise the flower-stalks, about a foot high, taper, hairy, and branching out at a little distance from the root: stem-leaves dividing into three parts, these again cut, and generally terminated by trifid points: the petioles are embracing at the base: the leaves are all hairy; the lower ones much larger and more compound than the upper: the flowers are terminating, with the stem naked for a considerable length below them. They vary much in size and colour, and the petals are frequently of different colours on the two surfaces. They appear in May; and in moderate seasons, or where they are shaded from the sun in the heat of the day, there will be a succession at least during a month: the seeds ripen in July. It is a native of the Levant.

The varieties are exceedingly numerous, being sometimes divided into two classes, as the Old Turkey kinds and the Persian kinds, the varieties of the latter amounting to many hundreds, and being considerably more various, rich, and beautiful in colour, than the others.

In the former of these they rise with a strong generally unbranching stalk a foot high, terminated by one large double flower, sometimes emitting one or two smaller ones from its sides, and of which there are red-flowered, scarlet-flowered, yellow-flowered, and scarlet turban-flowered, &c., being seldom tinged with different colours, as in the Persian kinds.

The latter rise eight or nine inches high, generally branching from the bottom, producing from five or ten to twenty or more flowers on each root, and of which there are single-flowered, semi-double-flowered, full-double-flowered, large and full like a double rose, being generally filled with petals to the very centre, forming a regular globular body, of admirable elegance, of all sorts of the most beautiful colours in different varieties, and of numerous degrees of deeper and lighter shades, stripes, and tinges in the several colours.

Martyn observes, that "the varieties produced of late years from the seeds of semi-double flowers are unbounded; and that Mr. Maddock remarks that they are more numerous than of any other flower. Accordingly his catalogue, he says, boasts nearly eight hundred, all with their proper names; ranged under the heads of—Dark and Dark Purple; Light Purple and Gray, &c.; Crimson, &c.; Reds, &c.; Rosy, &c.; Orange, &c.; Yellow and Yellow-Spotted, &c.; White and White-Spotted, &c.; Olive, &c.; Purple and Coffee-Striped, &c.; Red and Yellow-Striped; Red and White-Striped."

According to Mr. Maddock, "a fine Ranunculus should have a strong straight stem, from eight to twelve inches high. The flower should be of a hemispherical form, at least two inches in diameter, consisting of numerous petals gradually diminishing in size to the centre, lying over each other, so as neither to be too close nor too much separated, but having more of a per-

pendicular than horizontal direction, in order to display the colours with better effect. The petals should be broad, with entire well-rounded edges; their colours dark, clear, rich or brilliant, either of one colour or variously diversified, on an ash, white, sulphur or fire-coloured ground, or else regularly striped, spotted or mottled, in an elegant manner."

The second species is very handsome, three or four feet high and branched: the stem hollow within: the leaves large, digitate, three-lobed, divided to the base: segments lanceolate, serrate all round, somewhat hirsute, especially at the base: the flower white, terminating each branch. It is a native of the Alps of Europe.

There is a variety with double flowers, which has been obtained by seeds, and is preserved in many curious gardens for the beauty of its flowers. It is by some gardeners called *Fair Maid of France*. The root is perennial, and composed of many strong fibres: the leaves are divided into five lanceolate lobes: the four side-lobes are upon footstalks coming from the side of the principal stalk, and the middle one terminates it; they are deeply serrate, and have several longitudinal veins. The stalks rise a foot and a half high, and branch out at the top into three or four divisions, at each of which there is one leaf, of the same shape with the lower, but smaller. The flowers are pure white, and very double, each standing upon a short footstalk. It flowers in May.

The third has a perennial, tuberous root, with many long simple white fibres: the stem upright, about two feet high, round, hollow, having close-pressed hairs on it, not very leafy, much branched at top: the leaves are three-parted and five-parted, many-cleft; the segments black or deep purple at the points: the root-leaves on long upright petioles: the stem-leaves nearly sessile, less, and more finely cut: the uppermost linear and sessile: sheaths of the footstalks hairy. It flowers in June and July.

There is a variety with double flowers, which is the sort cultivated in the garden. It is frequent among other herbaceous perennials, under the name of *Yellow Bachelor's Buttons*.

The fourth species has a perennial root, consisting of numerous whitish fibres: the stems generally several from one root, a foot or more in length, beset with rough hairs, throwing out long creeping runners: the leaves are ternate, trifid and gashed, generally hairy on both sides, but sometimes smooth and shining, frequently marked with white (black) spots, on long hairy petioles dilated at the base: the leaflets also are on petioles, and are sometimes divided only into two segments: the leaves are broad, dark, and distinctly divided twice: the uppermost are quite entire: the flowering-stems are erect, branched and leafy, generally supporting two flowers. It flowers in June.

There is a variety with double flowers, which is the sort cultivated in the gardens.

In the fifth the leaves in part surround the stalk at their base, whence the trivial name: in colour they differ from most others of the genus, being of a grayer or more glaucous hue; which, joined to the delicate whiteness of the flowers, renders it very desirable in a collection of hardy herbaceous plants, more especially as it occupies little space, and has no tendency to injure the growth of others. It is a native of the Apennine and Pyrenean mountains, flowering in April and May.

Culture.—The first sort and the different varieties may be readily increased by the off-sets taken from the root, and new varieties may be raised from the seed.

In the first method the off-sets should be separated from the roots in dry weather, in the latter end of summer, when the flowering is over, and the stems and leaves are declining, being placed in bags or boxes, in a dry place, till the autumn, when they should be planted out in rows six or eight inches apart, and six of them in separate beds, prepared with light sandy earthy compost, to the depth of two or three feet, taking care to protect them carefully from the frost during the winter. When the buds begin to break through the ground they should be kept perfectly clear from weeds, protecting them from frosts; and when they have flowered and the stems are decayed, the root should be taken up, cleared from dirt, and placed in bags or boxes till the autumn, when they must be planted again.

In the second mode, the seed should be collected from the best plants, of the semi-double kinds, and be sown in flat pans or boxes, filled with light rich earth, in August, covering it in about a quarter of an inch thick with the same sort of earth, placing them in a shady situation, so as to have a little of the morning sun. The pots should remain here till the beginning of October, when the plants sometimes appear, though it is often later before this happens, when they should have a more open exposure with the full sun; but when frost is apprehended, they should be removed under a common hot-bed frame, being only covered in the nights and bad weather with the glasses, guarding them well against rains and frost.

In the spring following they should be exposed to the open air, being very slightly refreshed with water, having a situation to enjoy the

morning sun; and when their leaves and stems begin to decay, the roots may be taken up, dried in a proper place, and then put up in bags to be planted out in the same manner as the old roots in October.

In the following summer they will produce flowers; when such as are good should be marked, and the others removed from them. The plants intended to flower should not be suffered to run to seed, as roots which have produced seeds seldom furnish fine flowers afterwards. The disappointments experienced in purchasing these roots chiefly depend upon this circumstance.

The roots intended for the borders should be planted towards the spring in little clumps or patches, three, four, or five roots in each, putting them in either with a dibble or trowel about two inches deep and three or four asunder in each patch, and the patches from about three to five or ten feet distance, placing them in a varied manner in the borders.

In regard to their general culture after planting, such of the forward autumnal-planted roots of the choice sorts in beds as have shot above ground, should in winter, where convenient, have occasional shelter from hard frosts by mats supported on low hoop arches; or in very severe weather be covered close with dry long litter, removing all covering in open weather: and in the spring, when the flower buds begin first to advance, shelter them in frosty nights with supported mats, suffering them however to be open to the full air every day; but the latter plantings, that do not come up in winter or very early in spring whilst frosty nights prevail, will not require any protection, and all those distributed in patches about the borders must also take their chance in all weathers: those of the different seasons of planting will succeed one another in flowering from the beginning of April until the middle of June, though the May blow generally shows to the greatest perfection.

After the blow is past, and the leaves and stalks withered, the roots should be taken up and dried in the shade, then cleared from all offsets and adhering mould, putting them up in bags or boxes till next planting seasons, when they must be planted again as directed above.

In each season of planting, it is highly necessary, in the principal fine varieties, to put them either in entire new beds, or the old ones refreshed with some fresh rich earth or compost, working the old and new well together, in order to invigorate the growth of the plants.

The other species are capable of being easily raised by the roots, which should be slipped or parted in autumn when past flowering, or in the spring before they begin to shoot, and the slips be either planted at once where they are to remain, or in nursery-rows for a season, then planted out finally. They succeed in any common soil and situation, and may be dispersed about the different flower-borders and clumps, where they constantly remain, only trimming them occasionally; and once in a year or two, or when they have increased into large bunches, taking them up in autumn or spring to divide them for further increase, replanting them again directly.

In saving seed for raising new varieties, it must be suffered to continue on the plant till it becomes brown and dry, then be cut off, and spread upon paper, in a dry room, exposed to the sun, and when quite dry be put into a bag, and hung in a dry place till it is wanted.

All these plants are highly ornamental; the first sort in beds and pots, and the other in the borders, clumps, and other parts of pleasure-grounds.

RAPE. See BRASSICA.

RAPHANUS, a genus containing plants of the herbaceous annual esculent kind.

It belongs to the class and order *Tetradynamia Siliquosa*, and ranks in the natural order of *Siliquosæ*.

The characters are: that the calyx is a four-leaved perianth, erect: leaflets oblong, parallel, converging, deciduous, gibbous at the base: the corolla four-petalled, cruciform: petals obcordate, spreading: claws a little longer than the calyx: nectariferous glands four; one on each side, one between the short stamen and pistil, and one on each side between the longer stamina and the calyx: the stamina have six, awl-shaped filaments, erect; of these, two that are opposite are of the same length with the calyx, and the remaining four are the length of the claws of the corolla: anthers simple: the pistillum is an oblong germ, ventricose, attenuated, the length of the stamens: style scarcely any: stigma capitate, entire: the pericarpium is an oblong silique, with a point, ventricose with little swellings, subarticulate, cylindrical: seeds roundish, smooth.

The species cultivated is: *R. sativus*, Common Garden Radish.

It has an annual root, large, fleshy, fusiform or subglobular, white within, red or white or black on the outside: the stem upright, thick, very much branched and diffused, rough with pellucid bristles: the leaves rough, lyrate: the calyx green, rough-haired: the petals pale violet, with large veins running over them: the pod long, with a sharp beak, fungous, white, with distant streaks, many-celled: cells membranaceous, closed, in a double longitudinal

row, along the middle septum: the seeds, one in each cell, but in each row from three to twelve, subglobular, large, ferruginous, covered with very minute raised dots. It is a native of China.

There are several varieties; some of which have the appearance of distinct species, from their shape, size, and colour of the roots; as the *Long-rooted*, which is that commonly cultivated in kitchen-gardens for its roots. Of this there are several subordinate variations: as the Small-topped, the Deep Red, the Pale Red or Salmon, and the Long-topped Striped Radish. The small-topped is most commonly preferred by the gardeners near London, as they require much less room than those with large tops; for as forward radishes are what produce the greatest profit to the gardener, and these are commonly sown upon borders near hedges, walls or pales, the large-topped sorts would be apt to grow mostly at top, and not swell so much in the root as the other, especially if the plants should be left pretty close.

The *Small Round-rooted*, which is not very common here, but in many parts of Italy it is the only one cultivated;—the roots of this are very white, round, small, and very sweet. It is now frequently brought to the London markets in the spring, generally in bunches, and is sometimes mistaken there for young turnips: when eaten young, it is crisp, mild, and pleasant.

The *Large Turnep-rooted* or *White Spanish*, which has a moderately large, spheroidal white root, and is esteemed chiefly for eating in autumn and the early part of winter. Both these sorts are commonly called indiscriminately Turnep Radishes.

The *Black Turnep-rooted Spanish*, which has a root like the preceding, white within, but with a black skin; and is greatly esteemed by many for autumn and winter eating.

Culture.—These are raised from seed by different sowings from the end of October till April or the following month. They should have a light fine mould, and the more early sowings be made on borders, under warm walls, or other similar places, and in frames covered by glasses.

The common spindle-rooted, short-topped sorts are mostly made use of in these early sowings, the seed being sown broadcast over the beds after they have been prepared by digging over and raking the surface even, being covered in with a slight raking. Some sow carrots with the early crops of radishes.

It is usual to protect the early sown crops in the borders, during frosty nights and bad weather, by mats or dry wheat straw, which should be carefully removed every mild day. By this means they are brought more forward, as well as form better roots.

Where mats are used, and supported by pegs or hoops, they are readily applied and removed.

A second more general sowing should be made in January or February.

When the crops have got their rough leaf, they should be thinned out where they are too thick, to the distances of two inches, as there will be constantly more thinning by the daily drawing of the young radishes.

When the weather is dry in March, or the following month, the crops should be occasionally well watered, which not only forwards the growth of the crops, but increases the size of the roots, and renders them more mild and crisp in eating.

The sowings should be continued at the distance of a fortnight, till the latter end of March, when they should be performed every ten days, until the end of April or beginning of the following month. In sowing these later crops, it is the practice of some gardeners to sow coss-lettuces and spinach with them, in order to have the two crops coming forward at the same time, but the practice is not to be much recommended, where there is sufficient room.

In sowing the main general crops in the open quarters, the market-gardeners generally put them in on the same ground where they plant out their main crops of cauliflowers and cabbages, mixing spinach with the radish seed as above, sowing the seeds first, and raking them in, then planting the cauliflowers or cabbages; the radishes and spinach come in for use before the other plants begin to spread much, and as soon as those small crops are all cleared off for use, hoe the ground all over to kill weeds and loosen the soil, drawing earth about the stems of the cauliflowers and cabbages.

The Turnep Radish should not be sown till the beginning of March, the plants being allowed a greater distance than for the common spindle-rooted sort. The seeds of this sort are apt to degenerate, unless they are set at a distance from that kind.

The White and Black Spanish Radishes are usually sown about the middle of July, or a little earlier, and are fit for the table by the end of August, or the beginning of September, continuing good till frost spoils them. These should be thinned to a greater distance than the common sort, as their roots grow as large as turnips, and should not be left nearer than six inches.

To have these roots in winter, they should be drawn before hard frost comes on, and laid

in dry sand, as practised for carrots, carefully guarding them from wet and frost; as in this way they may be kept till the spring.

In regard to the culture of the general crops, they require very little, except occasional thinning where they are too thick, when the plants are come into the rough leaf, either by hoeing or drawing them out by hand; though for large quantities, small-hoeing is the most expeditious mode of thinning, as well as most beneficial to the crop by loosening the ground; in either method thinning the plants to about two or three inches distance, clearing out the weakest, and leaving the strongest to form the crop.

In order to save the seed, about the beginning of May some ground should be prepared by digging and levelling; then drawing some of the straightest and best-coloured radishes, and plant them in rows three feet distant, and two feet asunder in the rows; observing, if the season be dry, to water them until they have taken root: after which they will only require to have the weeds hoed down between them, until they are advanced so high as to overspread the ground.

When the seed begins to ripen, it should be carefully guarded against the birds. When it is ripe, the pods will change brown: then it must be cut, and spread in the sun to dry; after which it must be thrashed, and laid up for use where no mice can come at it.

Culture on Hot beds.—This method is sometimes practised in order to have the roots early, as in January or the following month. They should have eighteen inches depth of dung to bring them up, and six or seven inches depth of light rich mould. The seed should be sown moderately thick, covering it in half an inch thick, and putting on the lights: the plants usually come up in a week or less; and when they appear, the lights should be lifted or taken off occasionally, according to the weather; and in a fortnight thin the plants to the distance of an inch and half or two inches, when in six weeks they will be fit to draw. Where there are no frames to spare, the beds may be covered with mats over hoops, and the sides secured by boards and straw-bands. And when in want of dung, if the beds be covered with frames, and the lights put on at night and in bad weather, the plants may be raised for use a fortnight sooner than in the open borders.

RASPBERRY. See RUBUS.

RATTAN. See CALAMUS.

RATTLE, RED. See PEDICULARIS.

RATTLE, YELLOW. See RHINANTHUS.

RAUWOLFIA, a genus containing plants of the tender exotic shrubby kind for the stove.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Contortæ*.

The characters are: that the calyx is a five-toothed perianth, very small, permanent: the corolla one-petalled, funnel-form: tube cylindrical, globular at the base: border five-parted, flat: segments roundish, emarginate: the stamina have five filaments, shorter than the tube: anthers erect, simple, acute: the pistillum is a roundish germ: style very short: stigma capitate: the pericarpium a subglobular drupe, one-celled, with a groove on one side: the seed two nuts, convex at the base, attenuated at the top, compressed, two-celled.

The species are: 1. *R. nitida*, Shining Rauwolfia; 2. *R. canescens*, Hoary Rauwolfia.

The first is a small tree, shining all over very much, upright, full of a white glutinous milk, twelve feet high: the leaves at the joints of the twigs in fours, lanceolate, quite entire, sharp, petioled; the two nearest five inches in length, twice as long as the two others. Common peduncles racemed, terminating, half an inch long, two or three together: the flowers small, without scent, having white petals. The fruits are at first yellowish, but at length become very dark purple, are milky, and three times as large as a pea: globular, fleshy, twin, two-seeded: the nuts or stones, like those of grapes, of a bony substance. It is a native of South America, flowering here from June to September.

The second species is an upright shrub, the whole of it milky, from one to eight feet in height, with all the parts of a corresponding size, according to the soil and situation. The younger branches subtomentose: the leaves in fours, obovate, attenuated to the base, acute, wrinkled, tomentose underneath, quite entire, the two nearest longer than the other two. Petioles hirsute, round. Common peduncles branched, terminating in fours. (Cymes peduncled, several, and two at the forkings of the stem.) Flowers reddish, small, without scent. It is a native of the Caribbee Islands, &c.

Culture.—These may be increased by the seeds or berries, which should be sown in pots filled with light mould, in the autumn or spring, plunging them in a mild hot-bed. When the plants have attained some growth, they should be removed into separate pots, and have the management of other exotic stove plants.

They may likewise be raised by layers and cuttings, laid down or planted out in pots, plunged in the hot-bed in the spring and summer months, till they have stricken root, being afterwards managed as those from seed.

They afford much ornament and variety in

hot-house collections, both in their foliage and flowers.

REED HEDGE, that sort of hedge or fence which is formed from reeds. They are a sort of temporary internal fences made with these dried materials which may be had cheap, and be expeditiously formed into hedges by the assistance of posts and railing, being of great utility for occasional use in gardens, to inclose particular internal spaces of ground, so as to afford shelter to certain seedling plants, both in nurseries and large kitchen-gardens; and in some nurseries, to form places of shelter for many sorts of seedling trees and shrubs, &c. which being tender whilst young, require the shelter of a fence in winter to break off severe or cutting blasts two or three years, till they gradually gather strength and a greater degree of hardiness. They are also useful in training several sorts of wall-fruit-trees against, to form them for rows, or what are called Trained Trees; admitting of planting trees against each side of them, six, eight, or ten feet asunder. See NURSERY.

In large open kitchen-gardens they are occasionally made use of to inclose the melonary, or place for raising early melons and cucumbers in, and often as cross internal fences, under which to form warm borders for the purpose of raising various early crops of esculents.

The proper sort of reeds for these fences are the dried stems of the common marsh reed, which grows in great plenty by river sides, and in lakes, and marshy places, furnishing a crop of stems annually fit to cut in autumn, when they should be bound in bundles, and stacked up, or housed to remain for use.

These fences are sometimes erected in fixed ranges, and sometimes formed into moveable pannels. In the first mode, some stout posts should be placed six or eight feet asunder, and five or six high, and from post to post carry two or three ranges of flat thin railing, one range near the bottom, another near the top, and a third in the middle; against this railing, the reeds must be placed about two inches thick, having other railing fixed directly opposite, so that the reeds being all along between the double railing, the bottoms resting either upon a plate of wood, or let into the ground, but the former is preferable; and as soon as one pannel is formed, the railing should be nailed as close as possible, driving some long spike-nails through each double railing, or binding them with strong withy bands, or tar rope-yarn, but nailing is the best, in order to bring them as close as may be, to secure the reeds firmly in the proper position; the top should be cut even afterwards.

In the better method, a frame-work of railing should be prepared as above, each pannel six or eight feet long, and the reeds fixed therein as before directed; then, where they are intended to be placed, posts must be ranged six or eight feet distant to support the different pannels. Or sometimes the pannels may be placed inclining against the wall or other fence, in time of severe weather, when the borders are narrow. These sorts of fences are now in much less use in gardening than formerly.

RESEDA, a genus containing a plant of the flowering sweet-scented kind. It belongs to the class and order *Dodecandria Trigynia*, and ranks in the natural order of *Miscellaneæ*.

The characters are: that the calyx is a one-leafed perianth, parted: parts narrow, acute, erect, permanent; two of which gape more, for the use of the melliferous petal. The corolla consists of some petals (3. 5. 6.), unequal, some of them always half-three-cleft; the uppermost gibbous at the base, melliferous, the length of the calyx.

Nectary a flat upright gland, produced from the receptacle, placed on the upper side between the stamens and the uppermost petal, converging with the base of the petals. The stamina have eleven or fifteen short filaments. Anthers erect, obtuse, the length of the corolla. The pistillum is a gibbous germ, ending in some very short styles. Stigmas simple. The pericarpium is a gibbous capsule, angular, acuminate by means of the styles, gaping between them, one-celled: the seeds very many, kidney-form, fastened to the angles of the capsule.

The species cultivated is: *R. odorata*, Sweet Reseda, or Mignionette.

It has the root composed of many strong fibres, which run deep in the ground. The stems are several, about a foot long, dividing into many small branches. The leaves are oblong, about two inches in length, and three quarters of an inch broad in the middle, of a deep green colour. The flowers are produced in loose spikes at the ends of the branches, on pretty long stalks, and have large calices; the corollas are of an herbaceous white colour, and a fine smell. It is supposed a native of Egypt, flowering from June to winter. It is biennial.

Mr. Curtis observes, that "the luxury of the pleasure-garden is greatly heightened by the delightful odour which this plant diffuses; and as it grows more readily in pots, its fragrance may be conveyed into the house: its perfume, though not so refreshing perhaps as that of the sweet-briar, is not apt to offend the most delicate olfactories."

Culture.—This is raised from seed, which should be sown on a moderate hot-bed in March,

and when the plants are strong enough to transplant, be pricked out upon another moderate hot-bed to bring them forward, having a large share of air in warm weather to prevent their drawing up weak. Or they may be sown in pots of light mould and plunged in the hot-bed, which is probably the better practice. In the first mode, about the end of May the plants may be planted out, some into pots, to place in or near the apartments, and others into warm borders, where they may remain to flower and seed. The plants which grow in the full ground often produce more seeds than those which are in pots; but at the time when the seed-vessels begin to swell, the plants are frequently apt to be infested with green caterpillars, which, if they are not destroyed, eat off all the seed-vessels.

When the seeds are sown on a bed of light earth in April, the plants come up very well; and when not transplanted, grow larger than those which are raised in the hot-bed; but they do not flower so early, and in cold seasons scarcely ripen their seeds. In a warm dry border, however, the seeds often come up spontaneously, and grow very luxuriantly: but to have the flowers early in spring, the seeds should be sown in pots in autumn, being kept in frames through the winter, or on a gentle hot-bed in spring. The plants may also be preserved through the winter in a green-house, where they continue flowering most part of the year, but the second year they are not so vigorous as in the first.

It is cultivated for the fine fragrant smell which it affords.

REST HARROW. See Ononis.

RHAMNUS, a genus furnishing plants of the tree and shrub kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Dumosæ*.

The characters are: that there is no calyx, unless the corolla be taken for it: the corolla is an imperforate petal, externally rude, internally coloured, funnel-form: tube turbinate-cylindrical: border spreading, divided, acute: scalelets five, very small, each at the base of each division of the border, converging: the stamina have as many filaments as there are segments of the corolla, awl-shaped, inserted into the petal under the scalelet. Anthers small: the pistillum is a roundish germ. Style filiform, the length of the stamens. Stigma blunt, divided into fewer segments than the corolla: the pericarpium is a roundish berry, naked, divided into fewer parts internally than the corolla: the seeds solitary, roundish, gibbous on one side, flatted on the other.

The species cultivated are: 1. *R. catharticus*, Purging Buckthorn; 2. *R. colubrinus*, Pubescent Rhamnus, or Buckthorn—Redwood; 3. *R. frangula*, Alder Buckthorn, or Berry-bearing Alder; 4. *R. paliurus*, Common Christ's-thorn; 5. *R. alaternus*, Common Alaternus; 6. *R. jujuba*, Blunt-leaved Buckthorn; 7. *R. oenoplia*, Pointed-leaved Buckthorn; 8. *R. zizyphus*, Shining-leaved Buckthorn, or Common Jujube; 9. *R. Spina Christi*, Syrian Christ's-thorn.

The first rises with a strong woody stem to the height of twelve or fourteen feet, sending out many irregular branches: the young shoots have a smooth grayish-brown bark; but the older branches a darker and rougher bark, and are armed with a few short thorns. The leaves are two inches and a half long, by one and a quarter broad, dark green above but pale or light green beneath, having a pretty strong midrib, and several nerves proceeding from it, which diverge towards the sides, but meet again near the point: they stand upon pretty long slender footstalks. The flowers come out in clusters from the side of the branches: those of the male have as many stamens as there are divisions in the petal; those of the female (or hermaphrodite) have a roundish germ, which afterwards becomes a pulpy berry of a roundish form, inclosing four hard seeds. It is a native of Europe, flowering from the end of April to June, and ripening its berries about the end of September.

It is found that the juice of the unripe berries has the colour of saffron, and is used for staining maps or paper, being sold under the name of French berries: the juice of the ripe berries mixed with alum, is the sap-green of the painters; but if the berries be gathered late in the autumn, the juice is purple. The bark affords a beautiful yellow dye.

The second species is an upright tree, with most of the branches spreading out horizontally. The twigs, petioles, peduncles, lower surface of the leaves, and outer surface of the calyx, are covered with a slight ferruginous nap. The leaves are oblong-ovate, acute, entire, the upper surface smooth and shining, alternate, for the most part distich. The racemes short, corymbed, axillary, seven-flowered or thereabouts. The flowers are without scent, all pointing upwards, with greenish scales. It is a native of several islands in the West Indies, where it flowers in January, June, and November, but here in June.

The third rises with a woody stem to the height of ten or twelve feet, sending out many irregular branches, covered with a dark bark. The leaves are ovate-lanceolate, about two inches long and an inch broad, having several

transverse nerves from the midrib to the sides. the flowers are produced in clusters at the end of the former year's shoots, and also upon the first and second joints of the same year's shoot, each upon a short separate pedicel; they are small, of an herbaceous colour, and are succeeded by small round berries, which turn red, but are black when ripe. The flowers appear in June, and the berries ripen in September.

It is a native of most parts of Europe, flowering early in May, and sometimes in April.

The berries gathered before they are ripe, dye wool green and yellow—when ripe, blue-gray, blue, and green. The bark dyes yellow, and with preparations of iron, black.

There are two varieties, the broad-leafed, which has larger and rougher leaves—it grows naturally on the Alps; and the dwarf or round-leafed, which is of humble growth, seldom rising above two feet high—it grows on the Pyrenees.

The fourth species is a tree which rises with a pliant shrubby stalk to the height of eight or ten feet, sending out many weak slender branches, garnished with oval leaves placed alternately, standing upon footstalks nearly one inch long; these have three longitudinal veins, and are of a pale green. The flowers come out at the wings of the stalk in clusters, almost the length of the young branches; they are of a greenish-yellow colour, and appear in June, and are succeeded by broad, roundish, buckler-shaped seed-vessels, which have borders like the brims of a hat, the footstalks being fastened to the middle; these have three cells, each containing one seed. It is a native of the South of Europe, &c.

The fifth is a shrub with alternate, shining evergreen leaves, ovate, ovate-lanceolate, or lanceolate, often glandular at the base, having remote serratures about the edge. The flowers small, numerous, axillary, in short blunt racemes. There is a very small bracte at the base of each pedicel. The flowers are male and female or imperfect hermaphrodites, on the same or different individuals.

It is a native of the South of Europe and of Barbary. The fresh branches or young shoots, with the leaves, will dye wool a fine yellow. It flowers in April.

There are varieties with variegated leaves, commonly called Bloatched Phillyrea by the nurserymen: and with the leaves striped with white and with yellow, called Silver and Gold-striped Alaternus.

The latter has the leaves much longer and narrower, and the serratures on the edges much deeper: this shoots its branches more erect, forms a handsomer bush, and is equally hardy.

It is observed, that the Phillyrea is sometimes, and according to some, there are also the large-growing, the small-growing, the broad-leaved, the narrow-jagged-leaved, the yellow-striped jagged-leaved, the white-striped jagged-leaved—All which are confounded with the Alaternus, by such as are not botanists; but they may easily be distinguished by the position of their leaves, which are alternate in this, but placed opposite by pairs in that.

It is observed, that the Alaternus was much more in request formerly than at present; having been planted against walls in court-yards to cover them, as also to form evergreen hedges in gardens, for which purpose it is very improper, as the branches shoot very vigorously, and being pliant are frequently displaced by the wind; in winter, when much snow falls in still weather, the weight of it often breaks the branches; these hedges must also be clipped three times in a season to keep them in order, which is both expensive and occasions a great litter in a garden.

The sixth species is a tree with round branches. The leaves are very finely serrate, three-nerved, at the base on one side narrower, retuse, and there more deeply crenate, petioled. The flowers very many, axillary, each on very short pedicels, five-cleft, five-stamened; style bifid. Close to the petioles is a very small recurved prickle; but sometimes this is wanting. But according to Miller, it rises with shrubby stalks ten or twelve feet high, sending out many slender branches, which have a yellowish bark, and are armed with single recurved thorns (prickles) at each joint. The leaves are round, heart-shaped, about two inches in length and breadth, and indented at the footstalk; they have three nerves, and are covered with a yellowish down on their under side. The flowers come out in clusters from the wings of the branches, are small, of a yellowish colour, and succeeded by oval fruit about the size of small olives, inclosing a stone of the same shape. It is a native of the East Indies.

The seventh is a tree which has the leaves half-cordate or so on the upper side, but half-lanceolate on the hinder side, three-nerved, with the nerves branching, tomentose underneath, glaucous, on the wider side scarce manifestly serrate, petioled. In the axils on the opposite side are very many small clustered flowers, but on the same side with the petiole behind, is a recurved prickle. It is a native of the island of Ceylon.

In the eighth, according to Thunberg, the stem

is shrubby and branched; the branches and branchlets filiform and smooth; the prickles scattered, solitary or in pairs, commonly erect; the leaves alternate, on very short petioles, scarcely cordate, ovate and ovate-oblong, blunt with a very fine point, sometimes (but seldom) retuse, serrate, smooth, pale underneath, three-nerved, an inch long; the flowers axillary, two, three, or more together, very short and unequally peduncled; styles two, very short, with capitate stigmas. It is a native of the South of Europe, China, and Japan.

The fruit is sold in the market at Canton during the autumn. In Italy and Spain it is served up at the table in desserts during the winter season, as a dry sweetmeat.

The common or cultivated Jujube, according to Miller, has a woody stalk, dividing into many crooked irregular branches, armed with strong straight thorns, set by pairs at each joint: the leaves are two inches long and one broad, slightly serrate, on short footstalks: the flowers are produced on the side of the branches, two or three from the same place, sessile, small and yellow: the fruit oval, the size of a middling plum, sweetish and clammy, including a hard oblong stone, pointed at both ends.

The wild Jujube has slender woody stalks, which send out many weak branches, covered with a grayish bark, and armed with spines in pairs, one longer and straight, the other short and recurved: the leaves small, oval, veined, half an inch in length and breadth, and sessile. It is found about Tunis in Africa.

The ninth species sends up several shrubby stalks, dividing into slender branches, armed with straight spines, (prickles) set by pairs at each joint: the leaves are small, ovate, veined, alternate, upon very short footstalks: the flowers are small, yellow, axillary: the fruit round, about the size of the sloe. It is a native of Ethiopia.

Culture.—The first, third, and fourth sorts may be increased by seeds, layers, and sometimes by cuttings: the seeds should be sown in autumn as soon as ripe, on a bed of light earth, and slightly raked in: the plants mostly appear in the following spring, and when they have had a year or two's growth they should be planted out in nursery-rows, to have two or three years more growth, when they may be finally set out.

The layers should be made from the young shoots and be laid down in the autumn, in the usual way, giving a little twist or nick at the time, in the bark at a joint. They mostly become well rooted in twelvemonths.

Cuttings of the first and third sorts may be made from the young twigs, and be planted in rows in the autumn, in a bed of good earth, when most of them will succeed.

The evergreen or Alaternus kinds may be raised from seeds and by layers. The plain sorts succeed in both methods, but the variegated sorts only with certainty by layers.

The seeds should be put into the ground in the early autumn in the same manner as above, and the layers laid down in the autumn as in the other kinds.

The other species may be raised by sowing the stones of the fruit in pots in the spring, plunging them in a moderate hot-bed. When the plants have attained some growth they should be removed into separate pots and managed as other tender plants.

They also succeed by suckers from the roots and layers as in the above sorts.

The sixth and eighth sorts may be placed in the green-house, and the others in the stove.

These are all ornamental plants; the hardy sorts for the pleasure-ground, and the more tender sorts for the green-house and stove, among other potted plants.

RHEUM, a genus containing plants of the herbaceous perennial luxuriant kind.

It belongs to the class and order *Enneandria Trigynia*, and ranks in the natural order of *Holoraceæ*.

The characters of which are: that there is no calyx; or, which otherwise appears as the corolla, monopetalous, narrow at the base, and impervious, divided above into six parts, alternately smaller: the stamina have nine capillary filaments inserted into the corolla, and terminated by oblong didymous antheræ: the pistillum is a short triquetrous germen: the styles three, scarcely visible, and three reflexed plumose stigmas: there is no pericarpium, but one large, triquetrous, acute seed to each flower, having a membraneous border.

The species chiefly cultivated are: 1. *R. Rhaponticum*, Rhapontic or Common Rhubarb: 2. *R. palmatum*, Palmated-leaved, or True Chinese Rhubarb: 3. *R. Compactum*, Compact Thick-leaved Rhubarb: 4. *R. undulatum*, Waved-leaved Chinese Rhubarb: 5. *R. ribes*, Wasted-leaved Persian Rhubarb: 6. *R. Tataricum*, Tartarian or Heart-leaved Rhubarb.

The first has a large, thick, fleshy, branching, deeply-striking root, yellowish within, crowned by very large, roundish-heart-shaped smooth leaves, on thick, slightly-furrowed footstalks; and an unusual upright strong stem, two or three feet high, adorned with leaves singly, and terminated by thick close spikes of white flowers. It is a native of Thrace and Scythia. This sort

is of inferior quality to some of the following; but the plant being astringent, its young stalks and footstalks of the leaves being cut and peeled in spring, are used for tarts and other culinary uses.

It is stated, on the authority of several cultivators of this plant, by the editor of Miller's Dictionary, that, by proper attention in the growth and preparation of the root, it may be obtained here nearly in equal goodness to the foreign.

The second species has a thick fleshy root, which is yellow within, crowned with very large palmated leaves, being deeply divided into acuminated segments, expanded like an open hand; the stems upright, five or six feet high or more, terminated by large spikes of flowers. This is said to be the true rhubarb.

The third has a large, fleshy, branched root, which is yellow within, and crowned by very large heart-shaped, somewhat lobated, sharply indented, thick smooth leaves; and an upright large stem, five or six feet high, garnished with leaves singly, and branching above; having all the branches terminated by nodding panicles of white flowers. It has been supposed to be the true rhubarb, which, however, though of superior quality to some sorts, is accounted inferior to the second sort.

The fourth species also has a thick, branchy, deep-striking root, which is yellow within, and crowned with large oblong, undulate, somewhat hairy leaves, having equal footstalks, and an upright firm stem, four feet high, garnished with leaves singly, and terminated by long loose spikes of white flowers.

The fifth has a thick fleshy root, and very broad leaves, full of granulated protuberances, and with equal footstalks; the stems upright, firm, three or four feet high, terminated by spikes of flowers, succeeded by berry-like seeds, being surrounded by a purple pulp. It is a plant of much singularity.

The sixth has a thick fleshy root, and heart-ovate, plane, smooth leaves; the petioles half cylindric-angled. It is a native of Tartary.

Culture.—These plants are all increased by seeds, which should be sown in autumn soon after they are ripe, where the plants are designed to remain, as their roots being large and fleshy when they are removed they do not recover it soon; nor do the roots of such removed plants ever grow so large and fair as those which remain where they were sown. When the plants appear in the spring, the ground should be well hoed over, to cut up the weeds; and where they are too close, some should be cut up, leaving them at the first hoeing six or eight inches asunder; but at the second, they may be separated to a foot and half distance or more. When any weeds appear, the ground should be scuffled over with a Dutch hoe in dry weather; but after the plants cover the ground with their broad leaves, they keep down the weeds without any further trouble. The ground should be cleaned in autumn when the leaves decay, and in the spring, before the plants begin to put up their new leaves, be dug well between them. In the second year many of the strongest plants will produce flowers and seeds, and in the third year most of them. It is advised, that the seeds be carefully gathered when ripe, and not permitted to scatter, lest they grow and injure the old plants.

The roots continue many years without decaying; and it is said that the old roots of the true rhubarb are much preferable to the young ones.

These plants delight in a rich soil, which is not too dry nor over moist; and where there is a depth in such land for their roots to run down they attain a great size both in the leaves and roots.

Some cultivators think that the sowing is best performed in the later spring months; but in this way, as the seeds are slow in vegetating, there is much time lost. And a hot-bed has been sometimes employed, though it is not much advised.

The rhubarb plants may be also increased from offsets, separating some of the eyes or buds which shoot out on the upper parts of the root, together with a small part of the root itself, having some of the fibres to it. These offsets may be taken from roots of three or four years old, without any injury to the plant. By this method a year is saved, the plants are not in such danger of being devoured by vermin as those from seed, nor so uncertain in growing; they are not so tender, and only require keeping clear of weeds. There is no difference in the size of the roots thus raised, from those which grow from seeds. This method was practised by Mr. Hays, and in Mr. Hayward's practice several offsets were slipped from the heads of large plants in the spring, and set with a dibble about a foot apart. Four years after he took up the roots, and found them very large, and of excellent quality. "On further experience, when he took up his roots, either in spring or autumn, he divided the head into many parts; these he planted directly, at two feet distance, if intended for future removal; but if to remain for a crop, at four feet and a half."

In the culture of this root for medicinal uses the nature of the aspect is said not to be very material, provided it be not shaded too much on the south or west. The indispensable points are the depth and good quality of the soil, which should be light, loamy, and rich, but not too

much so, lest the roots be too fibrous: it can scarcely be too dry, for more evil is to be expected from a superabundancy of moisture than from any actual want of it. If, with these advantages, the plantation can be placed on a gentle declivity, such a situation may be said to be the most desirable. Where a plantation does not possess the natural advantage of being on a declivity, narrower beds and deepened trenches are among the artificial means that should be adopted; but most situations will require some care to prevent the ill effects of water remaining on the crowns of the plants: therefore, when the seedstalks are cut off, which ought always to be done immediately upon the withering of the radical leaves, they should be covered with mould in form of a hillock. This process will answer two good purposes; that of throwing off the rain, and keeping open the trenches by taking the earth from them.

It is observed that, the injuries to which the young plants are most liable, are from slugs and other small vermin, from inattention to the season and manner of planting, and from too great an exposure to frost. Little damage is to be feared from heat; and in general they are hardy and easy of cultivation when arrived beyond a certain term.

It is advised to take great care of the nursery-bed, as the pains bestowed by constant waterings, and protecting the young plants from the ravages of insects, will amply repay the planter. Roots that thrive well here, will in three years arrive at an equal size with others, that have not succeeded so well, at the end of five. When a plantation is to be formed, or a vacancy filled up, select the finest and most thrifty plants. No plant will come to any thing when it has lost its principal bud.

It is observed, that there is a difference of opinion in respect to the age at which the roots ought to be taken up for use; but is probably best done from four to eight years.

It is best taken up in the autumn in a dry time, and should be immediately dryed and prepared by cutting into pieces and cleaning.

Some plants of each of the sorts may also be introduced in the dry borders and clumps for the ornamental effect of the leaves and flowers.

RHEXIA, a genus containing plants of the hardy herbaceous perennial kind. It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Calycanthemæ*.

The characters are: that the calyx is a one-leafed perianth, tubular, ventricose at bottom, oblong, with a four-cleft border, permanent: the corolla has four roundish petals inserted into the calyx, spreading: the stamina have eight filiform filaments longer than the calyx, and inserted into it: anthers declining, grooved, linear, blunt, versatile: the pistillum is a roundish germ: style simple, the length of the stamens declining: stigma thickish, oblong: the pericarpium is a roundish four-celled, four-valved, capsule, within the belly of the calyx: the seeds numerous, roundish.

The species are: 1. *R. virginica*, Virginian Rhexia: 2. *R. Mariana*, Maryland Rhexia.

The first rises with an erect stalk near a foot and half high, four-cornered and hairy: the leaves lanceolate, hairy, about two inches long, and half an inch broad, entire and opposite: the stalk has two peduncles coming out from the side opposite to each other at the upper joint, and is terminated by two others; these each sustain two or three red flowers with heart-shaped petals, spreading open in form of a cross, and appear in June. It is a native of North America.

The second species sends up an erect stalk about ten inches high: the leaves lanceolate, about an inch long, and a third part of an inch broad, set on by pairs; and from every joint of the stalk two short shoots come out opposite, with small leaves of the same shape; the whole plant is thick set with stinging iron-coloured hairs: the stalk divides at the top into two peduncles, spreading from each other, having one or two reddish flowers on each, with a single subsessile flower between them; they have four heart-shaped petals, which spread open as in the preceding. It flowers about the same time, and is a native of Maryland, Brasil, Surinam, &c.

Culture.—These plants may be increased by sowing the seeds procured from their native situations, in the autumn or spring, in pots filled with good fresh mould, placing them under the protection of frames, or if in a mild hot-bed they will be rendered more forward. When sown at the latter season, the plants seldom appear the same year. When the plants have attained sufficient growth they should be planted out partly in a dry sheltered east border and partly in pots, to have the protection of a frame against the frosts in winter. They flower the second year, and with care continue three or four.

They afford ornament in the borders as well as among flowery potted plants.

RHODIA. See RHODIOLA.

RHODIOLA, a genus comprising a plant of the low herbaceous, odoriferous, succulent perennial kind. It belongs to the class and order *Dioecia Octandria*, and ranks in the natural order of *Succulentæ*.

The characters of which are: that in the

male, the calyx is a four-parted perianth, concave, erect, obtuse, permanent: the corolla has four oblong obtuse petals, from erect-spreading, double the length of the calyx, deciduous. Nectaries four, erect, emarginate, shorter than the calyx: the stamina have eight awl-shaped filaments longer than the corolla. Anthers simple: the pistillum has four oblong acuminate germs. Styles and stigmas obsolete: the pericarpium is abortive: female; the calyx is a perianth as in the male: the corolla has four petals, rude, erect, obtuse, equal with the calyx, permanent. Nectaries as in the male: the pistillum is as four oblong acuminate germs, ending in simple straight styles: stigmas obtuse: the pericarpium has four horned capsules opening inwards: the seeds very many, roundish.

The species cultivated is: *R. rosea*, Common or Yellow Rosewort.

It has a very thick fleshy root, which when bruised or cut sends out an odour like roses; with many heads, whence in the spring come out thick succulent stalks about nine inches long, closely garnished with thick succulent leaves of a gray colour, an inch long, and half an inch broad, indented on their edges towards the top, and placed alternately on every side the stalk; which is terminated by a cluster of yellowish herbaceous flowers, male and female, on distinct plants appearing early in May. They have a very agreeable scent, but are not of long continuance. It is a native of Lapland.

There is a variety in which the roots are smaller; the stalks small, and not above five inches long; the leaves small, ending with a purple point; the petals are purplish, and the stamens little longer than the petals. It flowers later.

Culture.—This plant may be increased by planting cuttings of the stalks in the beginning of April, soon after they come out from the head, in a shady border; covering them close down with a glass, and keeping them dry, when they mostly put out roots in about six weeks; but the cuttings should be laid in a dry room at least a week before they are planted out, otherwise they are apt to rot, and be destroyed.

They may also be raised by parting the roots in the beginning of autumn, when the stalks begin to decay; and when the fleshy parts are cut or broken they should be laid to dry a few days before they are planted. They require a shady situation, and a dry undunged soil, in which they will continue many years. They afford variety in the borders, clumps, &c.

RHODODENDRUM, a genus containing plants of the hardy, deciduous, and evergreen, flowering, shrubby kinds, Dwarf Rose-bay.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a five-parted permanent perianth: the corolla one-petalled, wheel-funnel-form: border spreading, with rounded segments: the stamina have ten filiform filaments, almost the length of the corolla, declined. Anthers oval: the pistillum is a five-cornered retuse germ. Style filiform, the length of the corolla. Stigma obtuse: the pericarpium is an ovate capsule, subangular, five-celled, divisible into five parts: the seeds numerous, very small.

The species are: 1. *R. ferrugineum*, Rusty-leaved Rhododendron: 2. *R. hirsutum*, Hairy Rhododendron: 3. *R. chamæcistus*, Dwarf Rhododendron, or Rose-bay: 4. *R. ponticum*, Purple Rhododendron: 5. *R. maximum*, Broad-leaved Rhododendron.

The first rises with a shrubby stalk near three feet high, sending out many irregular branches, covered with a purplish bark. The leaves are lanceolate, an inch and half long, and half an inch broad in the middle, entire, with reflexed borders, lucid green on their upper surface, and rusty-coloured underneath, placed all round the branches without order. The flowers are produced in round bunches at the ends of the branches: the corolla is funnel-shaped with a short tube, and is cut into five obtuse segments at the brim, spreading a little open, and of a pale rose colour. It is a native of Switzerland, flowering from May to July.

The second species seldom rises two feet high, and sends out many short woody branches, covered with a light brown bark. The leaves are ovate-lanceolate, about half an inch long, and a quarter of an inch broad, sitting pretty close to the branches; they are entire, and have a great number of fine ferruginous hairs on their edges and under side. The flowers are produced in bunches at the ends of the branches. The tube of the corolla is about half an inch long: the five segments of the brim are obtuse, spread half open, and are of a pale red colour. It is a native of the mountains of Switzerland.

The third is a small shrub, very much branched, the extreme branches leafy. The leaves are oblong, hard, on short reddish petioles. The peduncles one, or more, an inch long, villose, reddish brown, terminating. Calyx deeply five-cleft, of the same colour with the peduncle; the segments acute. The corolla purple, the segments ovate. The stamens longer than these. The style longer than the stamens. It is a native of Austria, &c.

The fourth species has an upright trunk, shrubby, commonly the height of a man, but

Painted by Syd Edwards. London Published Dec 1 1805 by G Kearsley Fleet Street Engraved by F Sansom

1 *Rhododendron ponticum*
Pontic Rhododendron

2 *Robina hispida*
Rose acacia

sometimes only half so high, frequently thicker than the human arm, very much branched from the bottom irregularly; the wood white, the bark ash-coloured. The branches round, scarred, with a smoothish testaceous bark. The leaves alternately scattered, coriaceous, large, quite entire, very smooth, becoming ferruginous underneath, scarcely nerved except the midrib, having a longitudinal streak on the upper surface, of a wide-lanceolate form, more attenuated towards the thick petiole. The flowering-buds formed in autumn for the year following, and consisting of ferruginous, ovate-acute, concave, very smooth, imbricate scales. The flowers in a short raceme at the end of the branchlets, about ten, and very handsome. It is a native of the Levant, flowering in May and June.

The fifth rises in its native soil, fifteen or sixteen feet high, with a shrubby stalk, sending out a few branches towards the top. The leaves stiff, smooth, six inches long and two broad, of a lucid green on their upper side, and pale on their under, whilst young; but afterwards changing to the colour of rusty iron: they have short thick footstalks, and are placed without order round the branches: between these the buds are formed for the next year's flowers; these swell to a large size during the autumn and spring months till the beginning of June, when the flowers burst out from their covers, forming a roundish sessile bunch or corymb. It is a native of North America, flowering here from June to August.

Culture.—These plants may be increased by sowing the seeds, which are very small, as soon as possible after they are procured, either in a shady border, or in pots filled with fresh loam, having them very lightly covered with a little fine mould, and plunging the pots up to their rims in a shady border, and in hard frost covering them with bell- or hand-glasses; taking them off in mild weather. When they are sown early in autumn, the plants come up the following spring, when they must be kept shaded from the sun, especially the first summer, and duly refreshed with water; in the autumn following removing them to a shady situation, on a loamy soil, covering the ground about the roots with moss, to guard them from frost in winter and keep the ground moist in the summer season.

They may also be increased from suckers or offsets, which they produce plentifully where they grow naturally, but seldom in this climate.

They are very ornamental in the border, clumps, and other parts of shrubberies.

RHUBARB. See Rheum.

RHUS, a genus containing plants of the tree and shrub kinds; Sumach and Toxicodendron.

It belongs to the class and order *Pentandria Triginia*, and ranks in the natural order of *Dumosæ*.

The characters are: that the calyx is a five-parted perianth, inferior, erect, permanent: the corolla has five ovate petals, from upright spreading: the stamina have five very short filaments: anthers small, shorter than the corolla: the pistillum is a superior roundish germ, the size of the corolla: styles scarcely any: stigmas three, cordate, small: the pericarpium is a roundish one-celled berry: the seed one, roundish, bony.

The species are; 1. *R. coriaria*, Elm-leaved Sumach; 2. *R. typhinum*, Stag's Horn Virginian Sumach; 3. *R. glabrum*, Scarlet Sumach; 4. *R. elegans*, Carolina Sumach; 5. *R. copallinum*, Lentiscus-leaved Sumach; 6. *R. cotinus*, Venice Sumach; 7. *R. toxicodendron*, Trailing Poison-oak, or Sumach; 8. *R. vernix*, Varnish Sumach; 9. *R. radicans*, Rooting Poison-oak, or Sumach; 10. *R. tomentosum*, Wooly-leaved Sumach; 11. *R. angustifolium*, Narrow-leaved Sumach; 12. *R. lucidum*, Shining-leaved Sumach.

The first has a strong woody stem dividing into many irregular branches, and rises to the height of eight or ten feet; the bark is hairy, and of an herbaceous brown colour whilst young. The leaves are composed of seven or eight pairs of leaflets terminated by an odd one: these leaflets are about two inches long, and half an inch wide in the middle, and of a yellowish green colour. The flowers grow in loose panicles at the end of the branches, each panicle being composed of several thick spikes of flowers sitting close to the footstalks: they are of a whitish herbaceous colour, and appear in July. It grows naturally in Italy, Spain, &c.

The branches are used instead of oak-bark for tanning leather, and it is said that Turkey leather is all tanned with this shrub.

The second species has a woody stem, from which are sent out many irregular branches, generally crooked and deformed. The young branches are covered with a soft velvet-like down, greatly resembling that of a young stag's horn both in colour and texture, whence it has vulgarly the name of the Stag's Horn Tree. The leaves have six or seven pairs of leaflets, terminated by an odd one; their under surface and the midrib are hairy. The flowers are produced in close tufts at the end of the branches in July, and are followed by seeds, inclosed in purple wooly succulent covers, so that the bunches are of a beautiful purple colour in autumn: the

Such sorts as have young branches sufficiently low, may have them laid down in the autumn in the slit method; when they will mostly have stricken root in the course of a year, and may be taken off and planted out where they are to remain, or in the nursery.

Those sorts that send up suckers from the roots should have them taken up during the winter, and planted out in nursery-rows in the manner of the seedlings, till of a proper growth to be planted out.

The seventh and ninth sorts may likewise be increased by their trailing branches, which have stricken root as they rest on the ground, which should be taken up with their roots entire in the autumn, winter, or any early spring, and be planted out either where they are to remain or in nursery-rows, till of sufficient growth for the purpose they are intended.

The first and fourth sorts being the most tender require the most sheltered situations.

Most of these plants afford a milky juice, which is extremely acrid and corrosive.

The three last sorts may be raised by cuttings and layers with great facility.

In the first method, the cuttings of the young shoots should be planted out in pots of light fresh mould, in the spring and early summer months, plunging them in a moderate hot-bed, where they readily strike root, being occasionally watered and shaded; and when they have formed good roots they may be potted off into separate pots.

In the latter mode any of the young wood may be laid down in the usual manner, in the early spring, when by the autumn they will mostly have stricken good root, and may be taken off, and be potted out the same way as the cuttings.

The first nine sorts have a fine effect in mixture with other deciduous shrubby plants, in the borders, clumps, and other parts of pleasure-grounds; and the three last afford variety among other potted green-house plants of the less tender kinds.

RHUS COBBE. See SCHMIDELIA.

RIBES, a genus containing plants of the hardy deciduous shrubby kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Pomaceæ*.

The characters are: that the calyx is a one-leafed perianth, half-five-cleft, ventricose: segments oblong, concave, coloured, reflex, permanent: the corolla has five, small, obtuse petals, erect, growing to the margin of the calyx: the stamina have five, subulate, erect filaments, inserted into the calyx: anthers incumbent, compressed, opening at the margin: the pistillum is a roundish germ, inferior: style bifid: stigmas obtuse: the pericarpium is a globular berry, umbilicated, one-celled: receptacles two, lateral, opposite, longitudinal: the seeds very many, roundish, somewhat compressed.

The species cultivated are: 1. *R. rubrum*, Common Currant; 2. *R. nigrum*, Common Black Currant; 3. *R. Grossularia*, Rough-fruited Gooseberry; 4. *R. Uva crispa*, Smooth-fruited Gooseberry; 5. *R. reclinatum*, Procumbent Gooseberry; 6. *R. oxyacanthoides*, Hawthorn-leaved Currant; 7. *R. cynosbati*, Prickly-fruited Currant.

The first has smooth branches: the leaves on longish petioles, doubly serrate, subpubescent: the racemes simple, nodding, when in fruit pendulous: the bracte ovate, small, shorter than the pedicels: the corolla yellowish green, with obcordate petals: the berries acid, shining. It is a native of Europe, flowering in May.

It is observed by Martyn, that this shrub is very apt to be infested with the *Aphis Ribes*, in which case the green leaves become red, pitted, and puckered. It has been long cultivated in the garden and greatly improved. There are several varieties: as the common sort with small red fruit; with white fruit, with pale fruit, commonly called the Champaign Currant, differing only in being of a pale red or flesh colour. But since the White and Red Dutch Currants have been introduced and become common, the old sorts have been almost banished, and are now rarely to be found.

Mr. Forsyth mentions the Fine new white Dutch, Long-branched red, Striped-leaved red white Currant, and Large pale and red Dutch.

There are also the Sweet Currant, the Small-fruited Currant, and a variety with blotched leaves, which is kept in some plantations; but as the variegation is apt to go off when the plant is vigorous, it scarcely deserves a place in them.

The second species is distinguished by its more humble habit, its strong-smelling leaves glandular underneath, its hairy racemes, tubular calyx, and black fruit, but especially by its solitary, one-flowered peduncle at the base of the receme, and distinct from it: the buds are glandular: the bractes woolly, and as long as the pedicels: the flowers villose, turban-shaped; the petioles also subvillose and glandular. It is a native of most parts of Europe, flowering in May.

There is a sort often termed the American Black Currant. The berries have a very peculiar flavour, which many persons dislike; but are commonly eaten in puddings in some parts, and make a tart little inferior to the Cranberry.

The juice is frequently boiled down to an extract, with the addition of a small proportion of sugar; in this state it is called Rob, and used in sore throats.

Currants are by some supposed the most useful of all the small fruits, either for table or culinary uses, as well as for wine, continuing long in succession with due management. The black sort is seldom sent to table.

This sort may be infused in spirit of any kind, in which way they make a good liquor.

The third is a low branching shrub: the prickles under the buds one, two, or three: the leaves three-lobed, gashed, subpubescent: the petioles hairy, commonly longer than the leaves: the peduncles one-flowered, nodding, having one, two or three opposite ovate ciliate bractes in the middle: the germ villose: the berries pendulous, hairy.

It is observed by the editor of Miller's Dictionary, that if the bractes do not distinguish this from the following, the roughness or smoothness of the berries will hardly do it, as Mr. Robson has found that seeds from the same plant will produce both rough and smooth fruit. He cannot regard them as different species. It is a native of several parts of Europe.

The fourth sort has the buds woolly: the calyx bent back: the peduncle woolly: the bracte ovate, embracing, generally with three divisions: the flowers solitary, pendent: the stipule, ciliate with knobbed hairs: a triple thorn beneath the buds: the berry crowned with the permanent calyx, peduncled, pulpy, subdiaphanous, pale, amber-coloured, red or purple, smooth, the pulp watery and sweet: receptacles formed of the skin of the berry thickened, oblong, narrow; with filiform umbilical chords, the length of the seeds, and inserted into their inner and blunter extremity: seeds as far as thirty, ovate-oblong, with a pellucid jelly about them, rufescent. It is a native of the northern parts of Europe.

Martyn remarks that the Gooseberry seems to have been formerly a fruit in very little esteem, but has received so much improvement that it is now become valuable, not only for tarts, pies and sauces, both fresh, and preserved in bottles, but as an early dessert fruit, and preserved in sugar for winter use, to answer the same purpose.

The most important varieties are of the Red kind; the hairy, smooth, deep red, damson or dark-red blueish, red raspberry, early black-red, Champaigne, &c.

Of the Green kind; the hairy, smooth, Gascoigne, raspberry, &c.

Of the Yellow kind; the great oval, great amber, hairy amber, early amber, large tawney or great mogul, &c.

Of the White kind; the common, white-veined, and large crystal.

But besides these, there is the rumbullion, large ironmonger, smooth ironmonger, hairy globe, and innumerable others, some of very large size, annually raised from seed, weighing from ten to fifteen pennyweights, but there are small ones better tasted. There are said to be upwards of two hundred, at least in name.

Mr. Forsyth gives the following list from the Catalogue of Messrs. Kirk, Nurserymen, at Brompton, near London:—

Supreme Red, Perfection Red, High Sheriff of Lancashire, Royal George, Unicorn, Rough Amber, White Walnut, Ackerley's Double Bearer, Royal Oak, Miss Bold's, Sparkler, Akerley's Rodney, Hampson's Cæsar, Monk's Charles Fox, St. John, Pigeon Egg, Worthinglowe's Conqueror, Golden Eagle, Royder's Triumph, Williamson's Yellow Hornet, Swingham, Jackson's Golden Orange, Goliah Champion, Warrington Red, Golden Drop, Costerdiner Goliah Champion, Hairy Amber, Nixon's Golden Eagle, Worthington's White Lily, Laylord's Seedling, Nixon's White Heart, Riding's Old England, Bakeley's Swingham, Tillotson's St. John.

And he adds another "list of the largest new sorts shown in Lancashire in the summer (1800), with their colour and weight, as communicated by Messrs M'Niven, nurserymen, Manchester:—

	dw.	gr.
Red Gooseberries.		
Alcock's King — —	16	15
——— Duke of York —	16	1
Boardman's Royal Oak —	15	4
Brundrit's Atlas — —	17	1
Chapman's Peerless — —	15	21
Dien's Glory of England —	16	2
Fairlow's Lord Hood —	14	5
Fisher's Conqueror — —	17	19
Fox's Jolly Smoker — —	15	8
Hall's Porcupine — —	13	20
Lomax's Victory — —	16	11
Mason's Hercules — —	13	16
Taylor's Volunteer — —	16	17
Worthington's Glory of Eccles	14	10
Yellow Gooseberries.		
Brundrit's Sir Sidney —	15	22
Davenport's Defender —	15	12
——— Creeping Ceres	16	0
Hamnet's Kilton — —	15	9
Hill's Golden Gourd — —	13	17
—— Royal Sovereign —	17	10
Leigh's Prince of Orange —	15	0
Parkinson's Goldfinder —	14	5

	dw.	gr.
Robinson's Crudus — —	13	17
Withington's Sceptre —	13	7
Green Gooseberries.		
Blakeley's Chissel — —	17	0
Boardman's Green Oak —	14	1
Brundrit's Tickle Toby —	14	6
Chadwick's Hero — —	13	10
Dean's Lord Hood — —	15	10
Mill's Langley Green —	16	2
Read's Satisfaction — —	15	4
Robinson's Stump — —	13	21
Smith's Green Mask —	13	20
Yates's Duke of Bedford —	14	11
White Gooseberries.		
Adams's Snow Ball — —	12	22
Atkinson's White Hall —	14	8
Chapman's Highland White	12	0
Davenport's Lady — —	15	0
Gibson's Apollo — —	14	20
Holding's White Muslin —	13	0
Kenyon's White Noble —	13	6
Moor's White Bear — —	14	19
Woodward's White Smith —	17	2

In favourable seasons, he says, many of the above sorts have been known to weigh more by several pennyweights."

The fifth has the leaves not only wider, but of a darker colour; prickles to each leaf one or two, but sometimes none; short and much weaker than in the common Gooseberry, besides others that are harmless and much shorter scattered over the branches: the fruit when ripe commonly dark purple, but sometimes red or even yellow. It is a native of Germany, flowering in April, and the fruit ripening in June and July.

The sixth species has more frequent and milder prickles than the common Gooseberry; the leaves are smooth and more deeply cut; the fruit small and round, the size and shape of a Currant; colour at first purple, but when ripe dark purple with a blue bloom; it is smooth, on a short slender peduncle; the pulp subacid, dusky purple, with one or two brown seeds, of a round form slightly angular. The stems are ash-coloured, with frequent slender brownish prickles, like the Burnet Rose, but less rigid; the young shoots are pale green, and have green prickles: the flowers one or two from an axil, white and yellowish white. It is a native of Canada, flowering in April and May.

The seventh has the appearance of the other species, but the leaves are little gashed: the prickle like a thorn under the axils: the peduncles generally three-flowered: the germ in the flower hairy, but not prickly. It has the corolla of the third sort: the berries the size of a hazel-nut, armed all over with stout prickles. It is a native of Canada, flowering in April.

Culture in the Currant Kind.—These may be raised with great facility from layers, seed, cuttings, &c.

In the first mode, when the trees are cut low, Mr. Forsyth advises the laying down some of the branches either in the winter or spring seasons, when the ground in the quarters or rows is dug, which should always be done annually. In the autumn following, these layers will have made fine roots; then they may be planted out where they are to stand, and they will mostly bear fine fruit in the following summer.

In the second method, the cuttings should be chosen of the strongest and straightest shoots, which should be cut six or eight inches in length, and be planted out on an east or north border, in the early autumn, at the distance of a foot from row to row, leaving only a few inches out of the ground. In this way they may be kept perfectly free from weeds. In dry weather, during the spring, they should be often refreshed with water. Some also raise these plants from suckers, but this is a method that should be avoided as much as possible, as they never grow handsome, and are apt to throw out suckers.

In respect to the seed, it should be sown on a border where the mould is fine, either in the autumn or early in the spring, and the young plants when they appear kept free from weeds. When they have attained sufficient growth they may either be planted out where they are to remain, or be set out in nursery-rows.

But Mr. Forsyth observes, that under the bushes that have been covered for late fruit, plenty of self-sown plants may constantly be found, which he advises to be planted out by themselves. And those who make currant-wine, may, he says, save the seed, after the fruit is squeezed, and dry it: it may then be sown in the manner directed above, by which, most probably, some fine varieties may be obtained. As in many gardens there still remains, the same writer says, a small sort of red and white currant not worth cultivating, he would advise those who have any of them to root them up, and plant in their room, the large red and white Dutch, the long-bunched red, and Champagne large pale red.

These plants may be planted out, Mr. Forsyth says, either in quarters or single rows round the edges of the quarters, in the gardens or other places.

And he "would particularly recommend planting a few against a south or west wall, or paling, which will produce fruit much earlier than in quarters, &c. Also to plant some be-

tween other fruit-trees on north walls, or palings, for later crops; these may be covered with double nets, to preserve them from birds; tucking in a few fern branches between the two nets, which will prevent the heat of the sun and drying winds from shrivelling the fruit. In the quarters they should be covered with mats for the same purpose; at the same time permitting all the leaves to remain on the bushes, to shade the fruit and make it keep the longer in a proper state."

In regard to the pruning of the bushes, the work may, according to the above author, "be begun in the month of November, and continued till March, as it suits the planter's convenience. And they should never be left too thick of wood; but a great deal depends on the management of them in summer, to have strong and fine wood for the following season. If they have been neglected for some years, and suffered to run up to long naked wood, they must, he says, be cut down near the ground; they will then set forth fine strong shoots. In this case, he would recommend heading down every other tree, and cutting the others partially, by taking out every other branch as near as can be to the ground, unless they are trained up with single stems, in which case it will be necessary to cut them as near as possible to where the branches begin to break out and form the head."

And "in the winter pruning, the strongest and finest shoots should be preserved, leaving them from nine to eighteen inches long, according to their strength, and from eight to ten inches apart, and as regular as possible from top to bottom of the tree; taking care to cut out all the dead and weak shoots." And "particular attention should be paid in summer, keeping the middle of the bush open to admit the sun and air; preserving the finest and strongest shoots that are nearest the stem. Some, he says, are fond of training them up with single stems, to a considerable height, to form fine round heads, which are very ornamental, if not suffered to run up too high; as in that case they are liable to be broken by the wind, if not well supported by stakes. Care must be taken not to let the shoots run to more than six inches long, because such short shoots will not be so liable to be damaged by the wind as long and weak ones are, especially when loaded with fruit. He prefers dwarfs from three to four feet high."

It is added, that "the same manner of pruning, &c., will do for Black Currants; but, as they grow stronger than the red or white, the shoots should be left thinner, and laid in longer, which will make them produce larger and finer fruit." And "those against walls and palings should have the shoots laid in thinner than those in the quarters, and trained as horizontally as possible, shortening them in the winter pruning to a foot or eighteen inches, according to the strength of the shoots."

And as this sort of fruit "is very liable to be devoured by earwigs, which take shelter under their leaves and branches, bundles of beanstalks should, he says, be hung up some time before the bushes are covered with mats or nets. If proper attention be not paid to this, the fruit will generally suffer very much from these insects. After the bushes are covered, take the mats off once in three or four days, and kill the earwigs that have got into the bean-stalks, which it will be necessary still to keep hung up. As there is a sweetness in the inside of beanstalks which attracts the earwigs, they very readily take shelter in them from rain. By proper attention to these directions, these destructive insects may be kept under, and the greater part of the fruit be preserved."

It is also necessary to carefully stock up all suckers at the roots of the trees, and keep them as clean as possible, otherwise they will prevent the sun and air from penetrating to the roots, and greatly weaken and injure the trees.

These plants are very liable to be infested with aphides and other insects, from which they should be freed as soon as possible, by proper picking, washing, and liming.

Culture in the Gooseberry Kind.—These are capable of being raised by cuttings and layers, as well as seeds for new varieties. They are likewise sometimes increased by suckers; but this last is not an advisable method, as the plants raised in this way are more apt to throw out suckers than those from cuttings or seed.

The cuttings should be made from the strongest and cleanest shoots, and have the length of seven or eight inches, being planted out in the early autumn, in a border which has an eastern or northern aspect, at the distance of about a foot from row to row, and having only about three or four inches of each cutting above the ground; as by this means they may be kept clean by hoeing. They require to be frequently watered in the spring season, when the weather is dry.

The layers may be laid down any time in the autumn or spring season, in the common way, when they readily strike root, and in the following autumn may be taken off and planted out where they are to remain, or in nursery rows, to get strength to be finally planted out.

The seed obtained from the ripened berries should be sown in the autumn or very early spring, in a bed of fine light mould; the

plants come up readily, and should be kept perfectly clear from weeds; and when they have had one or two years growth may be removed into nursery-rows, in the same manner as the Currants, to remain till they become fit for being planted out.

In this way good new varieties may be procured. Mr. Forsyth remarks, that the gardeners in the vicinity of Manchester have made great additions to the varieties of this fruit, and by mixing up a rich soil to plant them in, carefully watering, shading, and thinning the fruit, have brought the berries to a size much larger than had been before met with in this country; but that some of the layers are much thicker in the skin, and not so well flavoured as many of the old sorts.

The methods of planting out this sort of plants are extremely various. According to Mr. Forsyth, the market gardeners in the vicinity of the metropolis set them out in rows from eight to ten feet apart, and six from plant to plant. In cases of this sort he recommends that they should be pruned in the autumn, as about the beginning of October, when the ground between may be planted with coleworts, or beans for a spring crop; and by so doing, there will be no occasion to tread over the ground and hurt the coleworts in pruning the bushes; as before the Gooseberries begin to shoot, the coleworts will be all cleared off the ground.

And after this time (or before if you find it convenient), a good coat of rotten dung should be laid on the ground; then dig it and plant early potatoes; but not so near as to hurt the Gooseberries by their growth.

He likewise advises that the roots of Gooseberries should be kept clear to admit the sun and air. In small gardens he would recommend planting them in a quarter by themselves, at the distance of six feet between the rows, and four feet from plant to plant: they may be planted round the edges of the quarters, about three feet from the path; in which case the ground will be clear for cropping, and a man, by setting one foot on the border, can gather the Gooseberries without injuring the crop that may be on the border.

And that, as they like a rich soil, they should be dunged every year, or at least have a good coat of dung once in two years. They should never be planted under the shade of other trees, as it injures the flavour of the fruit.

In respect to the pruning of the bushes, "it is a practice too common, Mr. Forsyth says, to let them branch out with great naked stems, suffering them to remain in that state for years. When that is the case, they should be cut down near to the ground in the winter pruning, as it will make them throw out fine strong healthy shoots, which will bear fruit the second year: and as Gooseberry-bushes, in general, bear their fruit on the second year's wood, great care should be taken in summer to keep the middle of the bush clear to admit a free air, leaving the finest and strongest shoots from six to ten inches distant from each other. This will, he says, help to ripen and harden the wood. It is a practice with some to shorten the shoots in the autumn or winter pruning, which should be always near to a wood-bud; which may be known by its being single, whereas fruit-buds are in clusters. The shoots may, he thinks, be shortened to eight or ten inches, according to their strength. Some leave them at full length for three or four years, thinning out those that are superfluous. He advises always to leave a proper number to be trained up between the full-length shoots, to succeed them when they are tired of bearing; and then to cut the old ones down to the young ones that are to succeed them. By these means the bushes may always be kept in a constant state of bearing."

Those branches which were cut the first year, will in the second throw out short dugs, or spurs, which produce the fruit; and these should by no means be cut off, unless the branches are in a sickly state, and require to be cut close down when the bushes are overloaded with fruit. "It will then, he says, be necessary to cut out a good deal of the old wood, to assist nature to recover herself after producing so great a quantity of fruit."

He advises that "great attention be paid to the cultivation of the early and late sorts. In some old gardens, in particular, there are, he says, very valuable sorts that have been of late too much neglected; he would therefore recommend to those who live in the neighbourhood of such gardens, to observe their time of ripening, and to cultivate those especially which are early and late."

He adds, that "it is a practice with some to clip the tops of Gooseberries with a pair of garden shears, as they would clip a thorn hedge; this he by no means approves of, as the fruit will not be half the size, nor of so fine a flavour, as when the bushes are kept clear of such wood as is unnecessary."

It is recommended that great "care should be taken in spring and summer to stock, or grub up, all the suckers from the roots of the bushes, leaving their stems clear and unencumbered. And as many of the Lancashire sorts are apt to grow horizontally, and the branches frequently trail on the ground, which renders them

liable to be broken by high winds, especially when they are loaded with fruit, he would recommend two or three hoops to be put round them, to which the branches may be tied, to support them, and prevent their being broken by the wind, or any other means."

When it is wished to have them very late, they should be planted on north walls and palings, between the other trees, when they may be removed as the trees begin to meet. If laid in thin, they will bear very fine and handsome fruit. He would advise to plant the finest late sorts; as by this method the table will be supplied much longer than by the common custom of planting in quarters of the garden.

And "immediately after pruning, he always applies the Composition to the ends of the shoots and cuttings; and he finds it of great use in preventing the exhalation of the sap, and preserving the cuttings till they take root and become established."

These sorts of plants are very much infested with a small green caterpillar, which frequently devours both leaves and fruit: great attention is of course necessary to observe their first appearance on the bushes; as, if not destroyed early, they increase so fast, that they soon devour all the leaves, and the fruit is good for nothing. It is observed, that "they first appear generally on the edges and under-sides of the leaves."

In order to destroy them, he advises to "take some sifted quick-lime and lay it under the bushes; but not at first to let any of it touch the branches or leaves; then shake each bush suddenly and smartly, and the caterpillars will fall into the lime; if the bush be not shaken suddenly, the caterpillars, on being a little disturbed, will take so firm a hold as not easily to be shaken off. After this is done, some of the lime should be sifted over the bushes; this will drive down those which may have lodged on the branches. The caterpillars ought, he says, to be swept up next day, and the bushes well washed with clear lime-water mixed with urine; this will destroy any caterpillars that may still remain, and also the aphides, if there are any on the bushes at the time."

Forcing.—Sometimes trees of the gooseberry and currant kinds are forced for early fruiting, by means of artificial heat in fruit-forcing-houses, hot-walls, or forcing-frames, &c. For this purpose, some young trees should be planted in largish pots, one plant in each, and being advanced to a full state of growth for plentiful bearing, should be introduced in any of the above forcing departments that are in work by fire, or hot-bed heat, or both, in forwarding any principal sorts of fruit-trees, plants, or flowers, at the proper season, as about January or February, in which the same culture, in regard to the degree of heat, and other requisites, necessary for the other trees, &c., is suitable for these. Water should be given occasionally to the earth in the pots, and sometimes after the fruit is set, throwing it lightly over the branches on a warm sunny day; and they will thus produce ripe fruit in April or the following month.

The forcing of this sort of fruit is now however seldom much attended to.

RICINUS, a genus containing plants of the tall herbaceous tender annual kind.

It belongs to the class and order *Monoecia Monadelphia*, and ranks in the natural order of *Tricoccæ*.

The characters are: that in the male the calyx is a one-leafed, five-parted perianth: segments ovate, concave: there is no corolla: the stamina have very numerous filaments, filiform, branchingly collected below into various bodies: anthers twin, roundish:—females on the same plant: the calyx is a one-leafed perianth, three-parted: segments ovate, concave, deciduous: there is no corolla: the pistillum is an ovate germ, covered with subulate corpuscles: styles three, two-parted, from erect spreading, hispid: stigmas simple; the pericarpium is a roundish capsule, three-grooved, prickly all over, three-celled, three-valved: the seeds solitary, subovate.

The species cultivated is *R. communis*, Common Palma Christi.

It rises with a strong herbaceous stalk to the height of ten or twelve feet; the joints are at a great distance from each other; the stalk and branches are of a gray colour; the leaves large, and on long footstalks; deeply divided into seven lobes, and are gray on their under side. The flowers are disposed in long spikes, which spring from the division of the branches: the males are placed on the lower part of the spike; the females, which occupy the upper part, have prickly calyxes: the root is biennial, long, thick, whitish, and beset with many small fibres. It is a native of the Indies, flowering here in July and August.

It becomes a tree in its native situation, and the seeds afford the castor oil of the shops.

There are several varieties, as the Great American Palma Christi, which has brown stalks that divide into two or three branches, and rise six or seven feet high; the leaves are broader, and not so deeply divided; they are of a deep green on both sides, and are unequally serrate. The spikes of flowers are shorter, the seed-vessels rounder and of a brownish colour, and

the seeds are much less, and brown. It is a native of the West Indies.

The Green-stalked American Palma Christi, which has a thick herbaceous stem, of a grayish green, with the joints not so far asunder as in the preceding sorts: it rises about four feet high, and is divided at the top into three or four branches, which spread out almost horizontally: the leaves are large, of a deep green on their upper side, but grayish on their under; they are deeply cut into six or seven (sometimes eight) lanceolate segments, which are unequally serrate: the petioles spread out more horizontally than those of the common sort, and are much shorter: the principal stalk and branches are terminated by loose spikes of flowers: the covers of the capsules are green, and closely armed with soft spines: the seeds are smaller and lighter coloured than those of the preceding. It is also a native of the West Indies.

The Wrinkled-capsuled Palma Christi, which rises with an herbaceous stalk about four feet high: the lower part is purplish, and the upper deep green, the joints pretty far asunder: the leaves are of a deep green on their upper side, but paler underneath; they are not so deeply divided as some of the others, and are more regularly serrate: the spikes of flowers are large: the males have more stamens, with yellow anthers: the capsules are oval and wrinkled, but have no prickles: the seeds are small and brown. It is a native of both Indies.

The Red-stalked Palma Christi, which rises with a large reddish stalk to the height of ten or twelve feet, with many joints, and dividing into several branches: the leaves are very large, some measuring more than two feet and a half in diameter; are of a dark green, unequally serrate, and not so deeply cut as in some of the varieties: the spikes of flowers are large, and brown, with whitish anthers: capsules large, oval, and closely set with soft prickles: the seeds are very large, and beautifully striped. It is a native of Africa and both Indies.

The Small American Palma Christi, of which there are two sub-varieties, one with a red, the other with a pale-green stalk, distinguished in America by the names of Red and White Oil-seed: the stems seldom rise more than three feet high, sometimes dividing at the top into two or three branches: the leaves are much smaller and more deeply divided than in the other varieties; their borders are unequally serrate, and the segments of the leaves are frequently cut on the sides: the spikes of flowers are smaller and more compact: the capsules are also smaller, rounder, of a light green, and closely set with soft prickles: the seeds small, and finely striped. It is a native of Carolina, &c.

The Livid-leaved Palma Christi, which is an evergreen tree, ten feet in height, and more: the trunk, during the first year, is blood-red and very shining; afterwards it becomes woody, as thick as the wrist, hollow with transverse septa, pithy, with circular warts at the joints from fallen stipules, ash-coloured, interruptedly and slightly streaked: before the leaves come out, they are wrapped up in red stipules like sheaths, that fall off soon after: the leaves are divided half way into eight, sometimes ten lobes, which are serrate and acute, and the petiole is long; they are of a dark blood-red colour on the upper surface, and livid on the lower, with blood-red veins, the largest less than a foot in diameter, quite smooth, without any hairiness whatever: the fruit of a livid colour, with long soft prickles: the seeds shining, variegated with black and brown. It is a native of the East Indies.

Culture.—These plants are capable of being increased by seeds, which should be sown upon a hot-bed in the spring, and when the plants are come up, be each planted into a separate pot filled with light fresh earth, and plunged into a fresh hot-bed, watering and shading them until they have taken root; after which they must have a great share of free air when the season is mild, otherwise they draw up tall and weak. As the plants grow fast, and their roots in a short time fill the pots, they should be shifted into larger pots, filled as above; and about the end of May, when the season is warm, be hardened to endure the open air by degrees; when, if some of the plants be shaken out of the pots, and planted out into a very rich border, and in dry weather duly watered, they grow to a large size, and produce a great quantity of flowers and seeds. If it be intended to preserve any of the plants through the winter, they must not be planted out in the full ground, but be shifted into larger pots occasionally, as their roots require, placing them in the open air during the summer season in some warm situation, where they may remain until October, when they must be removed into the green-house with other exotic plants, watering them sparingly in winter, and admitting free air in mild weather, as they only require to be protected from frost and cold winds.

They have a fine ornamental effect in their leaves among other potted green-house plants, and also in the large open border or clumps, when cultivated as annuals, but they require room.

RIDGING OF GROUND, the practice of

throwing it up into high ridges, in order to lie fallow in winter, &c., to mellow, and improve in its quality and fertility.

This is work of great utility in the kitchen garden, as well as in other parts, but more especially in stiff and heavy soils, and cold wet lands. It is accomplished by trench-digging the ground over, laying the earth of each trench in a raised, rough ridge, lengthways, that by thus lying as high, open and hollow, as possible, it may meliorate and fertilise more effectually by the weather during the winter. And it receives further improvement from the levelling it down again, which is expeditiously effected, for the reception of the intended seeds, plants, roots, &c., which breaks, divides, and pulverises the earth still more effectually.

This ridging is generally performed either in the latter end of autumn, or any time in winter, or early in the spring, as the ground is the most vacant at those seasons, and not generally immediately wanted for any principal sowing or planting.

This sort of work is executed by beginning at one end of the plat of ground, and digging out a trench one or two spades in width, and a full spade's depth, removing the crumbs from the bottom, in the length-ways across the ground, and wheeling the earth to the finishing end, to be ready to fill up the last trench: so marking out a second trench close to the first, of the same width, then proceeding in the trenching and ridging, previously paring the top of the second trench, with all weeds, rubbish, or dung thereon, if any, into the bottom of the first, and then digging the ground of the second along regularly, the proper width and depth as above; turning the earth spit and spit into the first open trench, laying it in a raised ridge lengthways thereof, without breaking it fine, so that it may lie somewhat rough and hollow, according as the nature of the soil may admit: proceeding thus with another trench in the same manner, and continuing the same with the whole, trench and trench, to the end of the plat of ground; filling up the last trench with the earth of the first opened, laying it now ridge-ways as in the preceding trenches.

In the work of levelling down ridged ground, as wanted, it should proceed regularly, ridge and ridge, long-ways, levelling the earth equally to the right and left, loosening any solid parts, and breaking all large rough lumps and clods moderately fine; forming the whole in an even regular surface, in order for sowing and planting as required.

And in general, it is not advisable to lay down more than can be sown the same or next day, while the surface is fresh stirred, especially in broad-cast sowing and raking in the seed, as most generally all tolerably light mellow soils are more yielding to the rake while the surface is fresh moved; or before rendered wet by rain, &c., or very dry and hardened in the top earth by the sun, air, and winds, in dry weather, in the spring months, &c., and likewise, for sowing seeds by bedding in and covering in with earth from the alleys, &c., or with earth raked off the beds for that purpose, it would generally be most successful to perform it in a fresh stirred surface; though it is not so material in drill sowing: and besides, when seeds are committed to the earth while it is in a fresh turned up surface, especially in a dry season, they are more forwarded in a free regular germination than in ground that has lain some time after digging or levelling down. Though some grounds of a wet, or heavy, stiff nature, sometimes require to lie a few days after digging or levelling down, in order for the rough cloddy surface to mellow in some degree, either by drying a little, or by having a moderate rain, or sometimes both, to meliorate the lumpy clods, pliant to the rake, in the case of broad-cast sowing and raking in the seed.

RIVINA, a genus containing plants of the shrubby evergreen kind.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Holoraceæ*.

The characters are: that the calyx is a four-leaved perianth, coloured, permanent: leaflets oblong-ovate, blunt: there is no corolla, unless the calyx be taken for it: the stamina have four or eight filaments, shorter than the calyx, approaching by pairs, permanent: anthers small: the pistillum is a large germ, roundish: style very short: stigma simple, blunt: the pericarpium is a globular berry, placed on the green reflex calyx, one-celled, with a point curved in: the seed one, roundish, lens-shaped, rugged.

The species cultivated are: 1. *R. humilis*, Downy Rivina; 2. *R. lævis*, Smooth Rivina; 3. *R. octandra*, Climbing Rivina.

The first grows taller than the second, and the branches are more erect: the leaves are smaller, heart-shaped, and covered with short hairy down: the spikes of flowers are not so long; the flowers are not so closely placed together, and have longer peduncles. It is a native of the West Indies.

The second species rises with shrubby stalks six or eight feet high, dividing into several spreading branches, and covered with a gray spotted bark: the leaves alternate, lanceolate, entire, two inches and a half long and one inch

broad in the middle, drawing to a point at each end, smooth, of a lucid green, and pretty thick consistence, on long slender footstalks, and placed at pretty great distances on the branches: the flowers in long bunches, from the side and at the end of the branches, each on a slender peduncle near half an inch long: calyx scarlet: stamens eight, longer than the calyx: berry roundish, with a thin pulp, outwardly scarlet changing to purple; inclosing one roundish hard seed. It resembles the preceding very much, but is wholly smooth; but the leaves are purplish about the edge, and the flowers red on the outside. It is a native of the West Indies, flowering most part of the year.

The third rises with a climbing woody stalk to the height of twenty feet, covered with a dark gray bark: the leaves are oval-lanceolate, near three inches long, and an inch and half broad, smooth, entire, on short footstalks: the flowers come out in long bunches from the side of the branches, shaped like those of the second sort. The berries are blue, of the same size with those of the other. It is a native of the West Indies.

Culture.—These plants may be increased by seeds procured from the places where they are natives, sowing them as soon as they are obtained, in pots filled with fresh light earth, plunging them in a hot-bed when in summer, but in the tan-bed of the stove in the autumn or winter. The earth should be well moistened during the summer season, but very sparingly in the winter. They should be carefully preserved in these situations till the seeds vegetate, which is often a great length of time, of course the pots should not be disturbed.

When the plants have attained about two inches in growth, they may be removed into separate small pots, filled with light loamy mould, plunging them into a hot-bed, shading them till fresh rooted.

They afterwards require the management of other stove exotic plants.

They may likewise sometimes be raised by layers and cuttings, assisted by the heat of the bark hot-bed.

After these plants have been preserved in the stove of the hot-house till they have attained a good growth and strength, they are capable of being preserved in moderate warmth in winter, and in the warmest part of summer in the open air, in a warm sheltered place.

They afford variety among other potted evergreen stove plants.

ROBINIA, a genus comprising plants of the hardy deciduous tree and shrub sorts, with tender kinds for the stove.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leafed perianth, small, bell-shaped, four-cleft: the three lower toothlets more slender; the upper fourth toothlet wider, scarcely emarginate to the naked eye, all equal in length: the corolla papilionaceous: standard roundish, larger, spreading, blunt: wings oblong, ovate, free, with a very short blunt appendix; keel almost semiorbicular, compressed, blunt, the length of the wings: the stamina have diadelphous filaments, (simple and nine-cleft) ascending at top: anthers roundish: the pistillum is a cylindrical, oblong germ: style filiform, bent upwards: stigma villose in front at the top of the style: the pericarpium is a legume large, compressed, gibbous, long: the seeds few, kidney-form.

The species cultivated are: 1. *R. Pseud-Acacia*, False or Common Acacia; 2. *R. hispida*, Rose Acacia, or Robinia; 3. *R. Caragana*, Siberian Abrupt-leaved Robinia; 4. *R. frutescens*, Shrubby Robinia; 5. *R. pygmæa*, Dwarf Robinia; 6. *R. spinosa*, Thorny Robinia; 7. *R. violacea*, Ash-leaved Robinia; 8. *R. mitis*, Smooth Indian Robinia.

It grows very fast whilst young, so that in a few years from seed, the plants rise to eight or ten feet high, and it is not uncommon to see shoots of this tree six or eight feet long in one summer: the branches are armed with strong crooked thorns: the leaflets eight or ten pairs, ovate, bright green, entire, sessile: the flowers come out from the side of the branches in pretty long bunches, hanging down like those of Laburnum: each flower on a slender pedicel, white, and smelling very sweet: they appear in June, and when the trees are full of flower, make a fine appearance and perfume the air round them; but they seldom continue more than a week. It is a native of North America, where it grows to a very large size, and the wood is much valued for its duration.

There is a variety which has no thorns on the branches, but which is easily known at first sight by its peculiar appearance.

And the Echinated, or Prickly-podded American False Acacia, in which the pods are much shorter, and closely beset with short prickles, but in other respects agrees with the common sort.

The second species rises in its native situation sometimes to the height of twenty feet, but in this climate seems to be of low growth; the branches spread out near the ground, and produce their flowers very young: the young branches, and also the peduncles and calyxes are

closely armed with small brown prickles, or rather stiff bristly hairs, like raspberries and some sorts of roses: the leaves are like those of the first sort, but the leaflets are larger and rounder: the flowers are larger, and of a deep rose colour, but they have no scent: they come out early in June, and make a fine appearance; each flower is on a short separate pedicel: the legumes flat oblong. It is a native of Carolina.

The third has arboreous trunks, commonly branched from the bottom, slender, with a smooth, shining, coriaceous bark, covered by a greenish ash-coloured skin: branches alternate, very much divided; twigs rod-like, weak, very leafy, ash-coloured or greenish, with longitudinal nerves running from bud to bud: buds alternate, frequent, bearing both leaves and flowers, unarmed, with the stipules of the bud-leaves soft, but in the new branches spinescent, divaricating, rigid. It is a native of Siberia, flowering in April and May.

The fourth species has a branched trunk from the bottom, with a dusky or greenish-ash-coloured bark; there are commonly many lateral shoots or suckers from the root: the branches rod-like, pliant, loaded with leaves and flowers, of a shining yellowish colour, with longitudinal gray nerves, with triple spines: the leaves on the shoots of the year alternate, with spinescent stipules; from the buds in bundles, with unarmed stipules: the leaflets clustered, obovate, attenuated at the base, with a spinule at the end: petiole spinescent, after the leaves are fallen, hardening with the stipules into a triple spine: the peduncles on the branches of the preceding year from each bud, one, two, or three, bent a little at the joint, one-flowered. It is a native of Siberia, by the Volga, &c.

The fifth has trunks covered with a shining yellowish bark: wood of a very deep bay, almost as hard as horn: the older twigs round, with a beautifully golden shining cuticle; branchlets gray, with very frequent two-spined buds: the spinules slender like needles, spreading, arising from the stipules, in the older branches deciduous: the leaflets four or six in the spontaneous shrub clustered in bundles, quite sessile, linear acuminate, a little hispid: the peduncles springing singly from most of the buds on the branchlets among the leaves, the length of the leaflets, bent at the joint. In this climate it is a low shrub, seldom rising more than three feet. The flowers are yellow, and appear in April. It is a native of Siberia.

The sixth species resembles the third sort, but is distinguished by its stiff or thorny stipules: it is a shrub above the height of a man: the leaflets six or eight, ovate, even: common petiole woody, the whole of it perennial, thorny at the end: the stipules awl shaped, thorny, perennial: the trunk is scarcely an inch and half in diameter, with branches often a fathom in length, subdivided, twisted and diffused, so as to form a hemispherical head, full of branches and thorns. Being covered with flowers during the whole summer, it appears very beautiful: the wood bay-coloured within, on the outside yellow, and very hard: the cuticle on the younger branches greenish yellow, less shining, and more strigose than in the fifth sort, with ash-coloured longitudinal nerves, running from branch to branch: the branches are round, divaricating, alternate: the thorns spreading out every way almost at right angles, alternate, very large, arising from the permanent petioles enlarged, marked also with the scars of the leaflets, and having at the base on each side a small, bristle-shaped spinule, standing up, and arising from the stipules: there are several leaves and two or three flowers from the axils of all the spines on the branches: the petioles are spinescent: the leaflets commonly two pairs, but sometimes three and even four, linear-lanceolate, mucronate at the end with a spinule, opposite and remote: the peduncles are so short that the flowers seem to be sessile. It is a native of Siberia.

On account of the length and toughness of the branches, and its large stout thorns, it is admirably adapted to form impenetrable hedges, and is sufficiently hardy to bear our climate.

The seventh is an upright tree without thorns, growing to the height of twelve feet: the leaves alternate, numerous, shining; having three leaflets on each side, sometimes two, very seldom five; these are ovate, blunt, emarginate, entire, petioled, opposite, two inches long: the racemes axillary, half a foot in length; pedicels short, two-flowered, numerous: the flowers have the smell and colour of violets. It is a native of Carthagena.

The eighth species has a shrubby stem, three feet high, upright, branched: the leaflets ovate-lanceolate, smooth, bright green, two- or three-paired: the racemes terminating, short: the corolla yellow: the legume oblong, narrowing to each end, smooth: the branches round, unarmed: the leaflets five, ovate, smooth, quite entire: the racemes have three flowers fixed at each tooth, each on its proper pedicel: the calyx subtruncate. It is a native of the East Indies, &c.

Culture.—The first six hardy sorts are all capable of being raised from seeds, cuttings, layers, and suckers; but the seed method is said to afford the best plants.

The seeds should be sown about the end of March or beginning of the following month, on a bed of light mould, being covered to the depth of about half an inch. In the first sort and varieties the plants mostly appear in the course of six or eight weeks; but in the other kinds often not till the next spring. They should be well weeded and watered, and when sufficiently strong be set out in the spring or autumn in nursery-rows, for two or three years, in order to remain to have proper growth for final planting out.

The cuttings should be made from the young shoots, and planted out in the beginning of autumn, in a shady border where the soil is mellow. They are mostly well rooted in the course of a twelvemonth, when they may be removed into nursery-rows as above.

The layers should be made from the young wood, being laid down in the autumn, when in the course of the year they mostly become well rooted, and may be taken off and planted out in nursery-rows as the seedling plants.

The suckers, which are produced in plenty from the two first sorts, which may be removed in the early autumn or spring, and planted out in nursery-rows or in beds, to be afterwards removed into them.

The two last, or tender sorts, may likewise be raised from seeds and cuttings, but they must be sown and planted in pots, filled with good mould, to have the assistance of a hot-bed in the stove, by being plunged in it. When the plants have attained a little growth, they should be shaken out of the pots, and planted separately in small pots, filled with the same sort of earth, plunging them in the tan-bed, affording due shade till well rooted, managing them afterwards as other tender stove plants.

The plants are most tender while young; they should therefore be kept in the stove tan-bed till they have acquired strength, when they may be preserved in the dry stove, with a temperate heat in winter, and be exposed in the open air in summer, in a warm sheltered situation when the weather is fine.

The hardy sorts have a fine effect in the border clumps and other parts of pleasure-grounds, and the tender kinds afford variety in the stove collections.

ROBINSON CRUSOE's COAT. See CACTUS.

ROCAMBOLE. See ALLIUM.

ROCK-ROSE. See CISTUS.

RONDELETIA, a genus containing plants of the woody exotic stove kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Rubiaceæ*.

The characters are: that the calyx is a one-leafed perianth, superior, five-parted, acute, permanent: the corolla one-petalled, funnel-shaped: tube cylindrical, longer than the calyx, bellying a little at top: border five-parted, from reflex flat; segments roundish: the stamina have five awl-shaped filaments, almost the length of the corolla: anthers simple; the pistillum is a roundish, inferior germ: style filiform, the length of the corolla: stigma bifid: the pericarpium is a roundish capsule, crowned, two-celled: the seeds several, or sometimes solitary.

The species chiefly cultivated is *R. Americana*, American Rondeletia.

It rises with a woody stalk ten or twelve feet high, branching out on every side; the branches covered with a smooth greenish bark: the leaves are oblong, ending in acute points, entire, the upper surface lucid green, the under pale; they are a little crumpled, and stand alternate: the flowers come out in bunches at the end of the branches, are white, and have little scent. They appear in autumn, but are not followed by seeds in this climate.

Culture.—This plant may be increased by sowing the seeds on a moderate hot-bed in the early spring, and when the plants have attained a little growth they should be removed into separate pots, being plunged in the bark-bed of the stove, where they are to remain and be managed as other tender exotic plants of a similar kind.

They afford variety in stove collections.

ROSA, a genus containing plants of the deciduous flowering shrub and evergreen kind.

It belongs to the class and order *Icosandria Polygynia*, and ranks in the natural order of *Senticosæ*.

The characters are: that the calyx is a one-leafed perianth: tube ventricose, contracted at the neck; with the border spreading five-parted, globular: segments long, lanceolate-narrow (in some of them two alternate ones appendicled on both sides; two others, also alternate, naked on both sides; the fifth appendicled on one side only): the corolla has five petals, obcordate, the length of the calyx, inserted into the neck of the calyx: the stamina have very many filaments, capillary, very short, inserted into the neck of the calyx: anthers three-cornered: the pistillum has numerous germs, in the bottom of the calyx: styles as many, villose, very short, compressed close by the neck of the calyx, inserted into the side of the germ: stigmas blunt: there is no pericarpium: is a fleshy berry, turbinate, coloured, soft, one-celled, crowned with the rude segments, contracted at the neck,

formed from the tube of the calyx: the seeds numerous, oblong, hispid, fastened, to the inner side of the calyx.

The species cultivated are: 1. *R. lutea*, Single Yellow Rose; 2. *R. sulphurea*, Double Yellow Rose; 3. *R. blanda*, Hudson's-Bay Rose; 4. *R. cinnamomea*, Cinnamon Rose; 5. *R. arvensis*, White Dog Rose; 6. *R. pimpinellifolia*, Small Burnet-leaved Rose; 7. *R. spinosissima*, Scotch Rose; 8. *R. parviflora*, Small-flowered American Rose; 9. *R lucida*, Shining-leaved American Rose; 10. *R. Carolina*, Carolina Rose; 11. *R. villosa*, Apple Rose; 12. *R. provincialis*, Provence Rose; 13. *R. centifolia*, Hundred-leaved Rose; 14. *R. Gallica*, Red Rose; 15. *R. damascena*, Damask Rose; 16. *R. sempervirens*, Evergreen Rose; 17. *R. pumila*, Dwarf Austrian Rose; 18. *R. turbinata*, Frankfort Rose; 19. *R. rubiginosa*, Sweet Briar Rose; 20. *R. muscosa*, Moss Provence Rose; 21. *R. moschata*, Musk Rose; 22. *R. alpina*, Alpine Rose; 23. *R. semperflorens*, Deep-red China Rose; 24. *R. alba*, White Rose.

The first has weak stalks, which send out many slender branches closely armed with short crooked brown prickles: the leaflets two or three pairs, ovate and thin, smooth, of a light green, sharply serrate: the flowers on short peduncles, single, bright yellow, without scent. It is a native of Germany, &c.

There is a variety termed the *Austrian Rose*, which has the stalks, branches and leaves like those of the Single Yellow Rose, but the leaves are rounder. The flowers are also larger; the petals have deep indentures at their points; are of a pale yellow on the outside, and of a reddish copper colour, orange-scarlet, or Barré colour within; are single, have no scent, or a disagreeable one, and soon fall away. It has sometimes flowers entirely yellow on one branch, and copper-coloured on another.

The second species differs from the preceding, not only in the doubleness of the flowers, but in having the leaflets simply serrate, not glandular, pubescent and glaucous underneath; whereas in that they are doubly serrate, glandular and glutinous, and of a shining green colour, the stipules lacerated; the fruits hemispherical and glandular, which in the other are subglobular and smooth: the prickles on the stem are of two sorts in this; a few being larger, and many smaller. It is a native of the Levant, flowering later than that, as in July.

The third has the stems, when full grown, unarmed; the younger ones, or those of the first year, are armed with slender straight prickles bent a little back at the top: branches round, unarmed, shining, reddish: the leaflets commonly seven, oblong, sharply and almost equally serrate, smooth: the petioles smooth, generally armed with one or two spinules. It is a native of Newfoundland and Hudson's Bay, flowering from May to August.

The fourth species rises about four feet high: the branches are covered with a purplish smooth bark, and have no spines, except at the joints immediately under the leaves, where they are commonly placed by pairs; they are short and crooked: the leaflets seven, ovate, serrate, hairy on their under side: the leaves of the calyx narrow and entire: the flower small, with a scent like cinnamon, whence its name. But, according to Parkinson, the shoots are somewhat red, yet not so red as the double kind, armed with great thorns, almost like the Eglantine bush; thereby showing, as well by the multiplicity of its shoots as the quickness and height of its shooting, its wild nature: the roses are single, somewhat large, and of a pale red colour. It is a native of the South of Europe.

There is a double variety, in which the shoots are redder; the flowers small, short, thick, and double, of a pale red colour at the end of the leaves (petals), somewhat redder and brighter towards the middle. It is the smallest and earliest of the double garden roses, flowering in May.

The fifth has round, glaucous, often mahogany-coloured stems; with very long, thong-like branches, bowing, with scattered, hooked prickles, smaller than in the common Dog-Rose: the leaflets five or seven, but mostly five, ovate, pointed, smooth, simply serrate, glaucescent underneath: the petioles prickly: peduncles three or five in a terminating cyme, (rarely solitary) mahogany-coloured, covered with a glandular roughness, not all exactly from one point, accompanied by a few lanceolate bractes, and each bearing a single white flower, like the common Dog-Rose, but never red or blush-coloured, and less fragrant: fruit oblong; but in ripening it becomes globose, and deep red: the styles, as soon as they have passed through the neck of the calyx, are compacted into a cylinder, resembling a single style, terminated by a knob composed of the stigmas, which distinguishes it from the other species. It is a native of England, &c.

The sixth species has been confounded with what is commonly called the Scotch Rose; and some think it is not distinct from that. In the garden plant, according to Pallas, there are larger and setaceous prickles intermixed, and nine leaflets, the lower ones smaller. The flowers are white, and the segments of the calyx entire.

And the Siberian shrub is very elegant, a foot and half or at most two feet in height; the trunk thorny all over, the thickness of the little finger, very much branched, the branches collected into an ovate form: the spines on the trunk and branches very frequent, bristle-shaped, transverse or reclining, gray: the leaves very small, on red petioles, sometimes smooth, sometimes with small prickles on them: the stipules very narrow with wider earlets, external and serrate: the leaflets commonly seven, but sometimes nine or five, the size of the little finger nail, oval, cut round, sharply double-serrate, stiffish, rugged, more or less retuse, on some shrubs rather acute: the peduncles sometimes rough, sometimes smooth, with a ternate and simple leaf, almost to the flower: the fruit globose, smooth, and when ripe black, dry and insipid, being crowned with the segments of the calyx. It is a native of the South of Europe, as well as Asia, flowering here in May and June.

The seventh has its stems about two feet high, upright, much branched, with numerous straight, unequal, very slender needle-like prickles, on the young branches, which often disappear from the old ones: the leaflets seven or nine, small, roundish, blunt, serrate, smooth, sessile: their common petiole is sometimes prickly: the peduncles solitary, one-flowered, smooth, or very seldom prickly: the stipules small, halbert-shaped, toothed: the tube of the calyx almost hemispherical, smooth: the segments are entire: the petals white or cream-coloured, yellow at the base, delicately fragrant, sometimes striped with red: the fruit globose, deep red, black when quite ripe, smooth, but sometimes somewhat prickly. It is a native of most parts of Europe.

There are several varieties, as the Striped-flowered, or with variegated flowers, red striped with white.

The Red Scotch Rose, which seldom rises more than a foot high: the stalks are covered with a brown bark, and are closely armed with small spines; the leaves are very small; the flowers are also small, sessile, and of a livid red colour: the fruit is round, of a deep purple colour inclining to black when ripe.

And, according to Withering, there is also a variety with prickly peduncles, and cream-coloured flowers, changing to white.

Lawrence likewise mentions a double Scotch Rose.

The eighth species very much resembles the two following sorts; but differs in having the stem two feet high, the petioles hairy at the top, and the flowers in pairs. It rises with several slender stems to the height of two or three feet, covered with a brownish-green bark, and armed with a few sharp spines: the leaflets are seven or nine, oblong-ovate and sharply serrate: the leaves of the flower-cup have often linear leafy elongations: the corolla is single and of a pale reddish colour.

There is a variety with a double flower.

The ninth rises with several smooth stalks to the height of five or six feet: the young branches are covered with a smooth purple bark: the leaves are composed of four or five pairs of spear-shaped leaflets, smooth on both sides, of a lucid green on the upper surface, but pale on the under, and deeply serrate: the segments of the calyx long, narrow and entire: the flowers of a livid red colour, single, with little scent, appearing in July.

The tenth species has the stem five or six feet high, smooth: the stipular prickles two: the leaflets seven, oblong-ovate or nearly lanceolate, smooth, not shining, but opaque, serrate, paler underneath: the petioles prickly: the peduncles several, branched, forming a corymb, unarmed, with glandular hairs scattered over them: the leaflets of the calyx undivided, hispid on the outside: the petals obcordate, red. It is a sort that flowers late; and, like the two preceding, a native of North America.

The eleventh grows upright to the height of four feet or more: the branches are upright and short: the prickles on the stem and branches scattered, small, awl shaped, nearly straight: the leaflets seven, elliptical, bluntish, clothed on both sides with short velvet-like down, fragrant when rubbed, their serratures fringed with glands: the petioles downy, prickly, glandular: the peduncles terminating, mostly solitary, one-flowered, rough with rigid glandular bristles: the germ globular, bristly: the segments of the calyx long, downy, prickly on the outside: the corolla of a full rose-colour, not very odoriferous: the fruit globular, larger than in any other sort, and for the most part bristly and blood-red. It is found in Europe and Asia, and known as a cultivated sort in plantations, &c., both in a single and double state.

The fruit has a pleasant acid pulp surrounding the seeds, and is sometimes made into a conserve or sweetmeat, and served up at table in desserts, &c.

The twelfth species is well known in gardens, and one of the most beautiful sorts: the flowers are sometimes very large, and the petals closely folded over each other, like cabbages, whence it is called the Cabbage Rose: the flowers have the most fragrant odour of all the sorts.

According to Parkinson, the Great Double

Damask Provence, or Holland Rose, has its bark of a reddish or brown colour: the leaves likewise more reddish than in others, and somewhat larger. It usually grows very like the Damask Rose, and much to the same height: the flowers are of the same deep blush colour, or rather somewhat deeper, but much thicker, broader, and more double by three parts almost, the outer leaves turning back, when the flower hath stood long blown, the middle part itself being folded hard with small leaves: the scent comes nearest the Damask Rose, but is much short of it.

There are several varieties, as the Red Provence Rose: the stem and branches are not so great as those of the other, but greener, the bark not being so red: the flowers are not so large, thick and double, but of a little deeper damask or blush colour, turning to red, but not coming near the full colour of the best Red Rose: nor is the scent so sweet as that of the Damask Provence, but coming near that of the ordinary Red Rose. It is not so plentiful in bearing as the Damask Provence.

The Blush Provence Rose, in which the stalks rise from three to four feet high, and are unarmed: the leaves are hairy on their under side: the peduncles have some small spines: the segments of the calyx are semi-pinnate: the corolla has five or six rows of petals, which are large, and spread open; they are of a pale blush colour, and have a musky scent.

The White Provence Rose, which differs only in the colour of the flowers.

The Great and Small Dwarf Provence Roses, called Rose de Meaux, differ from each other in little except size: the smaller of the two is generally known by nursery-men and gardeners by the name of Pompone Rose. It throws out numerous stems, which rarely exceed a foot or a foot and half in height; usually straight, rigid, and very prickly: the flowers very small, and distinguished by the brilliant colour of the central petals, appearing in June.

All the sorts flower from July to August.

The thirteenth rises with prickly stalks about three feet high: the leaves have three or five leaflets, which are large, oval, smooth, and of a dark green with purple edges: the peduncles are set with brown bristly hairs: the segments of the calyx are smooth and semipinnate: the flowers are very double, and of a deep red colour, but have little scent. It is a native of China.

The varieties are very numerous; as the Dutch Hundred-leaved Rose; the Blush Hundred-leaved Rose; the Singleton's Hundred-leaved Rose.

The Single and Double Velvet Rose, which, according to Parkinson, has the old stem covered with a dark-coloured bark, but the young shoots of a sad green, with few or no thorns: the leaves are of a sadder green than in most roses, and very often seven on a stalk: the flower is single; or double with two rows of petals, the outer larger, of a deep red like crimson velvet; or more double, with sixteen petals or more in a flower, most of them equal: they have all less scent than the ordinary red Rose.

The Burgundy Rose, which is an elegant little plant, not more than a foot or eighteen inches in height.

The Sultan Rose; the Stepney Rose; the Gurnet Rose; the Bishop Rose; and the Lisbon Rose.

The fourteenth species has the stalks growing erect, and scarce any spines; they rise from three to four feet high: the leaves are composed of three or five large oval leaflets, which are hairy on their under side: the leaves of the calyx are undivided: the flowers are large, but not very double, spread open wide, and decay soon; they are of a deep red colour, and have an agreeable scent. "Parkinson gives the Red Rose the epithet of English, as this and the White are the most antient and known Roses to the country, and assumed by our precedent kings of all others, to be cognizances of their dignity, and because the Red is more frequent and used in England than in other places. The flowers, he says, vary in colour; some are of an orient red or deep crimson colour, and very double, although never so double as the White; some again are paler, tending somewhat to a damask; and some are of so pale a red, as that they are rather the colour of the Canker Rose; yet all for the most part with larger leaves than the damask, and with many more yellow threads (stamens) in the middle: the scent is much better than in the White, but not comparable to the excellency of the Damask Rose; yet this, being well dried and kept, will hold both colour and scent longer than the Damask."

There are several varieties: as the Red Officinal Rose; the Mundi Rose, which has the flowers very elegantly striped or variegated with red and white; in other circumstances it so perfectly resembles the Red Rose, that there can be no doubt of its being a variety of that; indeed it frequently happens that a Red Rose or two appears on the same plant with the variegated flowers.

The Childing Rose, the Marbled Rose, and the Double Virgin Rose, which have great affinity with each other, according to Miller.

The fifteenth rises with prickly stalks eight or ten feet high, covered with a greenish bark, and armed with short prickles: the leaves are composed of five or seven oval leaflets, dark green above, but pale underneath; the borders frequently turn brown and are slightly serrate; the peduncles are set with prickly hairs; the calyxes are semipinnate and hairy; the corolla is of a soft pale red, and not very double, but has an agreeable odour; the hips are long and smooth. It is a native of the South of France, &c.

There are several varieties: as the Red Damask Rose, the Blush Damask Rose, which differ only in the shade of colour.

The York and Lancaster Rose, which agrees with the Damask in stalk, leaf, &c., differing only in the flower being variegated with white stripes. Mr. Hart's Rose has the white stripes more distinct: the flowers in these being less double than in several others, are frequently succeeded by fruit, and have ripe seeds, from which other varieties may be obtained. According to Parkinson, "sometimes one half of the petal is of a pale whitish colour, and the other half of a paler damask than common; or one petal is white or striped with white, and the other half blush or striped with blush; sometimes also all striped or spotted over, and at other times little or no stripes or marks, and the longer it remains blown open in the sun, the paler and the fewer stripes, marks or spots will be seen in it. The smell is of a sweet Damask Rose scent."

The Red Monthly Rose, the White Monthly Rose, which are so called from their continuing to blow in succession during the greater part of the summer; not that they blow in every month, as the name implies. They are in every respect like the Damask Rose; unless it be that they are more full of prickles than that.

The Blush Belgic Rose, which rises about three feet high, with prickly stalks: the leaves are composed of five or seven leaflets, which are oval, hairy on their under side, and slightly serrate: the peduncles and calyxes are hairy, and without prickles; the calyxes are large and semipinnate; the flowers very double, of a pale flesh colour, with little scent, generally in great quantities.

The Red Belgic Rose, which differs only in having the colour of the flower a deep red.

The Great Royal Rose, and the Imperial Blush Damask Rose.

The sixteenth species has slender stalks which trail upon the ground unless they are supported, and if trained up to a pole or the stem of a tree will rise twelve or fourteen feet high; they are armed with crooked reddish spines, and have small leaves, with seven oval acute leaflets, of a lucid green, and serrate: the leaves continue on all the year: the flowers are small, single, white, and have a musky odour. In their natural place of growth they continue in succession great part of the year, but their time of flowering in this climate is June. It is a native of Germany.

The seventeenth has the branches with a great abundance of prickles, which fall off on the stems: the fruits are large and pear-shaped. It is a native of Austria and Italy.

The eighteenth species has the young shoots covered with a pale purplish bark, set with a number of small prickles like hairs: the older branches have but few thorns: the fruit is very large: the flower is thick and double as a red-rose, but so strong swelling in the bud, that many of them break before they can be full blown; and then they are of a pale red-rose colour, between a red and a damask, with a very thick broad hard umbone of short yellow threads in the middle: the segments of the calyx are quite entire: the smell is nearest a red rose.

The nineteenth has yellow hooked prickles on the stem, which is five or six feet high: the leaflets seven, very fragrant, elliptic or subovate, above smooth and wrinkled, underneath rust-coloured with resinous atoms or little dots: serratures glandular: the petioles also glandular and prickly: the peduncles muricate and in corymbs: the calyx glandular: the petals rose-coloured, white at the base: the fruit scarlet, muricate, but sometimes smooth, farinaceous, insipid.

The cultivated plant grows larger and more erect: the leaves are bigger and much sweeter than in the wild one, the rusty colour of them disappears, and the whole puts on a more vigorous appearance: the sweet scent is supposed to proceed from the gland. It is a native of most parts of Europe.

There are varieties with double flowers: as the Common Double Sweet Briar, the Mossy Double Sweet Briar, the Evergreen Double Sweet Briar, the Marbled Double Sweet Briar, the Red Double Sweet Briar, the Royal Sweet Briar, and the Yellow Sweet Briar.

The twentieth species, which is mostly denominated the Moss Rose, from the moss-like pubescence on the calyx, has the stalks and branches closely armed with brown spines: the peduncles and calyx are covered with long hair-like moss: the flowers are of an elegant crimson colour, and have a most agreeable odour. It is known to us only in its double state, and the country to which we are indebted for it is not ascertained.

The twenty-first, or Musk Rose, rises with

weak stalks to the height of ten or twelve feet, covered with a smooth greenish bark, and armed with short strong spines: the leaflets seven, light-green and serrate; the flowers in large bunches, in form of umbels, at the end of the branches, are white, and have a fine musky odour, appearing in July and August, and continuing in succession till the frost stops them. The stalks are too weak to support themselves. There is a variety with double flowers.

The editor of Miller's Dictionary considers the Evergreen Musk Rose of Miller to be the same with this.

The twenty-second species is a low shrub, with reddish-brown stems, the lower half or thereabouts of which is covered with straight awl-shaped slender white not pungent prickles; the upper part is quite naked: the stipules ciliate-glandular at the edge: the petioles hispid, and glandular: the leaflets commonly seven, smooth on both sides, ovate, biserrate, ciliate, glandular: the peduncles naked, unarmed: flowers solitary, red, middle-sized. It is a native of the Alps, &c., flowering in June and July.

The twenty-third has a height seldom exceeding three feet: the flowers large in proportion to the plant, semidouble, with great richness of colour (dark red) uniting a most delightful fragrance, coming out in succession during the greater part of the year, only more sparingly in the winter months: the segments of the calyx leafy at the end, one larger than the rest: the germs and peduncles sometimes, but rarely, smooth. It is a native of China.

The twenty-fourth species in its wild state has ovate leaves, smooth and deep green above, paler and slightly hairy underneath, unequally serrate and blunt: the stem and petioles villose, prickly: the peduncles solitary, long, hispid: fruits ovate, smooth, but more frequently having a few slender prickles on them: calyxes smooth, green, half-pinnate. It is a native of Europe, China, &c.

According to Parkinson, there are two varieties of the White Garden Rose; one attaining sometimes the height of eight or ten feet, with a stock of a great bigness, the other seldom higher than a Damask Rose. Both have somewhat smaller and whiter-green leaves than in many other roses, five most usually on a stalk, and paler underneath; as also a whiter-green bark, armed with short prickles. The flowers in the one are whitish, with an eye of blush, especially towards the bottom, very double, and for the most part not opening so fully as the Red or Damask Rose. In the other more white, less double, and opening more. Some have only two or three rows of petals; and all have little or no smell.

Culture.—In all the sorts the increase may be effected by suckers, layers, or by budding upon stocks of other sorts of roses; but this last method is only practised for some peculiar sorts, which do not grow well upon their own stocks, and send forth suckers sparingly. Where more sorts than one are to be had upon the same plant, such sorts only should be budded upon the same stock as are nearly equal in their manner of growth, otherwise the strong one will draw all the nourishment from the weaker.

The suckers should be taken off in October, and planted out either in nursery-rows, or the places where they are to remain; as where they are permitted to stand upon the roots of the old plants more than one year, they grow woody, and do not form so good roots as if planted out the first year.

The best method to obtain good-rooted plants is to lay down the young branches in autumn, which will take good root by the autumn following; especially when watered in dry weather; when they may be taken off from the old plants, and be planted out where they are to remain. The seeds are sometimes sown in the autumn, to produce new varieties, in beds of light mellow earth, or in drills, especially for the Common Sweet Briar kinds, and for raising hedges of them.

Almost all the sorts delight in a rich moist soil and an open situation, in which they produce a greater quantity of flowers, and those much fairer, than when they are upon a dry soil, or in a shady situation. The pruning which they afterwards require is only to cut out their dead wood, and take off all the suckers, which should be done every autumn; and if there are any very luxuriant branches, which draw the nourishment from the other parts of the plant, they should be taken out, or shortened, to cause them to produce more branches, if there be occasion for them to supply a vacancy; but it is best to avoid crowding them with branches, which is as injurious to these plants as to fruit-trees; for, if the branches have not equal benefit from the sun and air, they will not produce their flowers so strong, or in so great plenty, as when they are more open, and better exposed to the sun, so as to have a more free circulation of air. As the Moss Provence Rose seldom sends out suckers, and does not strike very freely by layers, it is often increased by budding it upon stocks of the other sorts; but the plants are best when raised from layers.

The best sort for flowering early and late is the Monthly, next to which in flowering in the open air is the Cinnamon, which is immediately followed by the Damask Rose, then the Blush, York, and Lancaster; after which, the Provence,

Dutch Hundred-leaved, White, and most other sorts: and the latest sorts are the Virginia and Musk Roses, which, if planted in a shady situation, seldom flower until September; and, if the autumn proves mild, continue often till the middle of October. And the plants of the two sorts of Musk Roses should be placed against a wall, pale, or other building, that their branches may be supported, otherwise they are so slender and weak as to trail upon the ground. These plants should not be pruned until spring, because their branches are somewhat tender; so that when they are cut in winter, they often die after the knife; these produce their flowers at the extremity of the same year's shoots in large bunches, so that their branches must not be shortened in the summer, lest the flowers should be cut off. The shrubs will grow to be ten or twelve feet high, and must not be checked in their growth, if intended to flower well. They are all highly ornamental plants, mostly for the shrubbery borders and clumps, being planted according to their habits of growth.

ROSE-BAY. See NERIUM.

ROSE, CAMPION. See AGROSTEMMA.

ROSE, CHINA. See HIBISCUS.

ROSE, GUELDER. See VIBURNUM.

ROSEMARY. See ROSMARINUS.

ROSE of JERICHO. See ANASTATICA.

ROSE, ROCK. See CISTUS.

ROSE, ROOT. See RHODIOLA.

ROSMARINUS, a genus containing plants of the hardy shrubby evergreen kind.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leafed perianth, tubular, compressed above: mouth upright, two-lipped: upper lip entire, lower bifid: the corolla unequal: tube longer than the calyx; border ringent: upper lip two-parted, upright, shorter, acute, with the edges bent back: lower lip bent back, trifid; the middle segment very large, concave, narrow at the base; the lateral ones narrow, acute: the stamina have two awl-shaped filaments, simple with a tooth, inclined towards and longer than the upper lip. Anthers simple: the pistillum is a four-cleft germ: style of the same figure, situation and length with the stamens: stigma simple, acute: there is no pericarpium: calyx containing the seeds at the bottom: the seeds four, ovate.

The species are: 1. *R. officinalis*, Officinal Rosemary.

It has a strong woody fibrous root. The stem shrubby, covered with a rough gray bark, divided into many branches, and in gardens rising frequently to the height of eight or ten feet; but in its natural state much lower. The leaves numerous, sessile, linear, entire, blunt, contracted at the edges, dark green above, grayish or whitish underneath, with small glandular excavations, placed in whorls on the branches: the flowers from the axils of the leaves, from six to twelve together, large, pale blue, sometimes white with blue spots and dots. It is a native of the South of Europe, &c., flowering from January to May.

There are varieties with narrow leaves; with broad leaves; with silver-striped leaves, and with gold-striped leaves.

Culture.—In all the sorts it may be effected by planting slips or cuttings in the early spring months as from March to May; as well as by layers, in performing the first methods of which, a quantity of young shoots should be cut or stripped off from about five or six to eight or ten inches long, stripping off the lower leaves, and then planting them in a border of light earth, in rows a foot asunder, giving a good watering and repeating it frequently till they are rooted, which they effect in a short time, in the same year, shoot at top, and become tolerable little plants by autumn; when about the beginning or middle of September, or in spring following, they may be transplanted where they are designed to remain for growth.

The layers should be laid down in any of the convenient lower young branches, into the earth in the spring, summer, or autumn, and they will be well rooted by autumn following, when they may be taken off and planted out where they are to remain for plants.

Almost all the varieties are moderately hardy evergreen plants, though the common green sorts are the most so; the striped kinds being liable to suffer by hard frosts, if much exposed, or planted in wet ground, of course they as well as all the sorts should have a warm situation and dry soil: some of the variegated kinds should also be potted, in order to have shelter of a green-house in winter. They are most durable in dry poor soils.

They afford variety in the border, clumps, and other parts of gardens and shrubberies.

ROYENA, a genus containing plants of the shrubby evergreen exotic kind for the green-house.

It belongs to the class and order *Decandria Digynia*, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a one-leafed, pitcher-shaped, five-cleft, permanent perianth: the corolla one-petalled: tube the length of the calyx: border spreading, revolute, five-

parted; segments ovate: the stamina have ten very short filaments fastened to the corolla: anthers oblong, acute, twin, erect, the length of the tube: the pistillum is an ovate germ, ending in two styles, a little longer than the stamens: stigmas simple: the pericarpium is an ovate capsule, four-grooved, one-celled, four-valved: berry globular, fleshy, four-celled, covered by the permanent corolla: the seeds, four nuts, oblong, triangular, wrapped in an aril: seeds solitary, in all four or two, oblong or elliptic, subtriquetrous or plano-convex.

The species cultivated are: 1. *R. lucida*, Shining-leaved Royena, or African Bladder-nut; 2. *R. villosa*, Heart-leaved Royena, or African Bladder-nut; 3. *R. glabra*, Myrtle-leaved Royena, or African Bladder-nut; 4. *R. hirsuta*; Hairy-leaved Royena, or African Bladder-nut.

The first is in height eight or ten feet, putting out branches on every side: the leaves alternate, shining, continuing all the year: the flowers from the wings of the leaves along the branches, having little beauty: the fruit a berry covered with the permanent calyx, which is coriaceous, torn, and striated within, globular, smooth, red above, pale below, four-celled: the flesh or pulp firm, whitish, almost like that of the apple: the cells filled with a pulp clear like glass, and not invested with any proper membrane, two of them commonly abortive, compressed, crescent-shaped: the seeds solitary, and two or four in all. It is a native of the Cape, flowering in May and June.

The second species resembles the preceding; but the branches are villose: the leaves elliptic or oblong, cordate at the base, tomentose underneath, bluntish on short villose petioles: the flowers axillary, nodding, solitary, on villose peduncles the length of the flowers: the bractes two, opposite, ovate acute, pubescent, larger than the calyx and immediately under it, deciduous.

The third rises with a shrubby stalk, five or six feet high, sending out many slender branches, covered with a purplish bark: leaves less than those of the Box-tree, entire, of a lucid green, and continuing all the year. The flowers come out from the wings of the leaves round the branches, and are white. Fruit roundish, purple, ripening in the winter. It flowers in September.

The fourth species rises with a strong woody stalk seven or eight feet high, covered with a gray bark, sending out many small branches alternately: the leaves about an inch long, and a quarter of an inch broad in the middle, covered with soft hairs: the flowers come out on short peduncles from the side of the branches; are of a worn-out purple colour and small: they appear in July, but are not followed by seeds in this climate.

Culture.—These plants are often rather troublesome in raising, but their culture may be attempted by cuttings and layers. The cuttings should be made from the young shoots, and be planted in the early spring in small pots filled with a loamy earth, plunging them in a very moderate hot-bed, covering them carefully with hand glasses, refreshing them often with water in small proportions. When they have stricken roots and are begun to shoot, inure them gradually to the open air, and when they are well rooted remove them into separate small pots, managing them afterwards as other rather tender green-house plants, such as the Orange-tree, &c.

The layers may be made from the young bottom shoots, laying them carefully down by slitting them as for Carnations, watering them often in the warm season, but very moderately in the cold. When they are become well rooted, take them off and plant them in separate pots in the same manner as the cuttings, giving them the same sort of management afterwards.

The last sort often sends up suckers from the roots, and may sometimes be increased by planting in the same way as the cuttings.

They afford variety among other green-house plants.

RUBIA, a genus containing plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Stellatæ*.

The characters are: that the calyx is a very small perianth, four-toothed, superior: the corolla one-petalled, bell-shaped, four-parted, without a tube: the stamina have four awl-shaped filaments, shorter than the corolla: anthers simple: the pistillum is a twin inferior germ: style filiform, bifid at top: stigmas capitate: the pericarpium-berries two, united, smooth: the seeds solitary, roundish, umbilicate.

The species mostly cultivated is *R. tinctorum*, Dyer's Madder.

It has a perennial root, and an annual stalk. The root is composed of many long, thick, succulent fibres, almost as large as a man's little finger; these are joined at the top in a head, like the roots of Asparagus, and strike very deep into the ground, being sometimes more than three feet in length. From the upper part (or head of the root) come out many side roots, which extend just under the surface of the ground to a great distance, whereby it propagates very fast; for these send up a great number of

shoots, which, if carefully taken off in the spring, soon after they are above ground, become so many plants. These roots are of a dark colour on their outside, somewhat transparent, and have a yellowish red pith in the middle, which is tough and of a bitterish tase ; from the root arise many large, four-cornered, jointed stalks, which in good land will grow five or six feet long, and, if supported, sometimes seven or eight ; they are armed with short herbaceous prickles, and at each joint are placed five or six spear-shaped leaves, about three inches long, and near one broad in the middle, drawing to a point at each end; their upper surfaces are smooth, but their midribs on the under side are armed with rough herbaceous spines ; the leaves sit close to the branches in whorls. From the joints of the stalk come out the branches, which sustain the flowers ; they are placed by pairs opposite, each pair crossing the other ; these have a few small leaves toward the bottom, which are by threes, and upward by pairs opposite ; the branches are terminated by loose branching spikes of yellow flowers, which are cut into four segments resembling stars. They appear in June. It is a native of the South of Europe, the Levant, and Africa.

Madder is so essential to dyers and calico-printers, that these businesses cannot be carried on without it.

Culture.—They are increased by offsets or suckers, from the roots of the old plants in the spring, as April or the following month ; which should be slipped off soon after they appear above ground, by opening the earth round the roots, and taking off the side suckers with as much root-part and fibres to each as possible, preserving the tops entire ; which should be planted directly, in the manner directed below. The ground being well prepared by frequent deep ploughing, or trenching over, and the proper quantity of sets or suckers provided, they should with a dibble be planted in rows two feet asunder, and one distant in the row, putting each plant low enough in proportion to the length of its root, leaving most of the green top out of the ground, and closing the earth well about each set, as the work proceeds. Some set these plants in beds, three rows length-ways, at two feet distance, with wide alleys between bed and bed, in order for landing up the crowns of the roots two or three inches deep in winter.

They shoot up into stalks the same year in either mode, but the roots require two or three years' growth before they are large enough for use ; during which period they should be kept clean from weeds all the summer by broad-hoeing, in dry weather ; and in autumn, when the stalks decay, cutting them down, and then slightly digging the ground between the rows, raising it somewhat ridge-ways along the rows of the plants, an inch or two thick over their crowns ; or, if they are in beds, they may be landed up from the alleys to the same depth ; the same culture being repeated till the autumn of the third year, when the roots will be fit for taking up for use. This is performed by trenching the ground the way of the rows, beginning at one end of it, and opening a two-feet-wide trench close along by the first row of plants, digging down to the depth of the roots to get them clean out to the bottom ; then opening another trench close to the next row, turning the earth into the first; and so on, trench and trench, till the whole is taken up and removed.

These plants succeed best in a light rich deep soil: the roots are sometimes used fresh for dyeing, being prepared by washing and pounding; but commonly when designed for keeping, or to be sent to a distance, are dried in some covered airy shed; then all the mould being rubbed off, and the roots made sufficiently dry, are sold to those who manufacture them for use, if not performed by the cultivator: this consists in drying them in a kiln or some stove-house, &c. then thrashing them to beat off the outer skin, in order to separate it from the inner part of the root, as being of an inferior quality. The roots being then dried in a kiln about twenty-four hours, are removed to a mill or pounding-house, where they are pounded in a long hollow oaken block, with stampers kept in motion by the mill ; and when thus reduced to powder, sifted and put up in casks

The plants are sometimes employed for variety in the border or other open parts of gardens or pleasure-grounds.

RUBUS, a genus containing plants of the under-shrubby and herbaceous perennial kind.

It belongs to the class and order *Icosandria Polygynia*, and ranks in the natural order of *Senticosæ*.

The characters are: that the calyx is a one-leafed, five-cleft, perianth: segments oblong, spreading, permanent: the corolla has five roundish petals, the length of the calyx, from upright spreading: the stamina have numerous filaments, shorter than the corolla, inserted into the calyx: anthers roundish, compressed: the pistillum has numerous germs: styles small, capillary, springing from the side of the germ: stigmas simple, permanent: the pericarpium is a berry compounded of roundish *acini*, collected into a convex head, concave below ; each one-celled : the seeds solitary, oblong: the receptacle of the pericarps conical.

The species are: 1. *R. idæus*, Raspberry; 2. *R. occidentalis*, Virginian Raspberry; 3. *R. odoratus*, Flowering Raspberry; 4. *R. fruticosus*, Common Bramble; 5. *R. hispidus*, Bristly Bramble; 6. *R. cæsius*, Dewberry Bramble; 7. *R. arcticus*, Dwarf Crimson Bramble; 8. *R. Chamæmorus*, Mountain Bramble, or Cloudberry.

The first has the stems suffruticose, biennial, upright, round, aculeate-hispid, or thick set with small prickles, two feet high; they produce fruit the second year, after which they lie down. The leaflets rhomb ovate, acute, marked with lines, unequally serrate, white underneath. The petioles pubescent, prickly. The peduncles hispid. The flowers in panicles. The fruit red, grateful to the smell and taste, deciduous, bristly with the permanent styles placed upon a conical receptacle. It is a native of many parts of Europe, flowering in May and June.

The varieties are: the Red-fruited, the White-fruited, the Twice-bearing, of which the first crop ripens in July, and the second in October, those of the latter season having seldom much flavour; the Smooth Raspberry, and the large Antwerp. The sorts mostly cultivated, according to Mr. Forsyth, are: the Early White, the Double-bearing White, the Large Common White, the Large Red, the Large Red Antwerp, the Large White Antwerp, the Smooth Cane Double-bearing, and the Woodward's New Raspberry.

The second species rises with purplish stalks, a little higher than the common sort. The leaves are of a lucid green on their upper side, but hoary on their under; their foot-stalks are taper; the fruit is of a deep black when ripe, has little flavour, and ripens late in autumn. It is a native of North America, flowering in May and June. It varies with a red fruit, more acid and pleasant than the European Raspberry.

The third has a perennial creeping root. The stems many, from four to seven feet high, about the size of a man's little finger, covered with a smooth bark of a light brown colour, and branching out a little towards the top. The leaves six inches long and seven inches broad, cut into three, four, or five angular lobes, ending in acute points, serrate, having several veins arising from the midrib, running upwards, diverging towards the borders, deep green above, but light green and smooth beneath; on foot-stalks four inches long, coming out alternately. The flowers in loose terminating bunches, each on a long peduncle. Petals large, roundish, of a light purple colour. The fruit is rarely produced here; but in North America, its native country, it is like the common Raspberry, only not so pleasant. It flowers from June to September.

The fourth species has very long, trailing, or rather arching, woody stems, of a purplish hue; tough, with the angles strongly marked, and the prickles hooked. The leaves quinate, or sometimes ternate; leaflets somewhat elliptical, doubly-serrate, acute, dark-green and shining above, white and downy beneath; but sometimes the under side is merely hairy and of a paler green. All the leaflets are petioled; and the petioles are prickly. The stipules bristle-shaped. The panicles many-flowered, subracemed, tomentose. The fruit of a dark violet colour, with a mawkish sweet taste, composed of very numerous acini or grains. There are several varieties; but that which is chiefly introduced as a garden shrub is the Double-flowered Bramble.

The fifth has the stems with long procumbent woody shoots like those of the vine; these together with the petioles have stiff bristles scattered over them. The leaflets gash-serrate, the middle one petioled. The peduncles also are hispid. It is a native of Canada, flowering in August.

The sixth species has the stems prostrate, round, rooting, pale green with a vivid glaucous tinge: though woody, they are only annual, or at most biennial. The leaflets gashed and serrate, downy (not hoary) beneath: the lateral leaflets sessile, generally lobed on the outside, of various forms. Stipules lanceolate. The petioles downy, prickly, obscurely channelled above. The flowers few together, in terminating, downy, somewhat prickly panicles. The fruit black, with a bright blue tinge or bloom, composed of few large grains. Its flavour is agreeably acid, without the faint taste of the fourth sort. It is a native of Europe, flowering in June and July.

The seventh has a creeping root, but no runners. The stems are from a hand to a span in height, upright, simple, angular. The leaves unequally serrate, commonly altogether smooth. The flowers solitary, peduncled, terminating, deep rose-coloured, with the petals sometimes jagged. The fruit purple, sweet and fragrant, very pleasant, and, according to Linnæus, almost as large as a mulberry. It is a native of the North of Europe.

The eighth species is a plant of an elegant appearance, with a creeping root, a simple stem, hardly a foot high, upright; mallow like, but smooth and hardish leaves, petioled, cordate, five-lobed, plaited, wrinkled, unequally serrate. The flowers terminal, peduncled, white; male and female, the former with short abortive pistils, the latter with abortive stamens. The berries are of a tawny or dull orange colour, com-

posed of many acini, acid, mucilaginous and not unpleasant. It is a native of Sweden, &c.

Culture.—In the first sort and varieties it may be effected by suckers and layers. The plants should always have a portion of ground to themselves, being planted at the distance of about six feet from row to row, and four in the rows, with the exception of the Early White sort, which may be set out closer.

According to Mr. Forsyth, the ground should first be well trenched over and dunged; then, making choice of the strongest and finest plants that come out from the sides of the stools, where they have been standing for some years, or encouraging the strongest plants that come out betwixt the rows after digging, which should be done annually, they may be planted out as above. In digging the ground, it frequently happens that the roots are cut with the spade, which occasions a great number of small plants to come up; of these the strongest and finest should, he says, be selected, hoeing up all the superfluous ones. But he prefers laying down some of the strongest outside shoots in the month of March; as by the following autumn they will make fine roots, and may be planted out in a quarter or piece of ground where they are intended to remain. These will not be so liable, he thinks, to throw out suckers as those which are produced from suckers. The fresh pieces of ground should always be planted in moist weather, as the roots are very delicate, and liable to be hurt when exposed to a dry air. If, however, they are planted in dry weather, he advises that care be taken to moisten the roots with water, and cover them well with wet litter, or leaves, during the time in which they are planting out. In performing the work a trench should be opened with a spade along the line where the suckers or layers are to be planted, cutting off all the small fibry roots with a knife, leaving only the stronger roots; putting them into the trench, and covering them with some earth; then watering them well, and throwing the remainder of the earth over them, letting them remain till you have finished planting the piece; then, where you first began to plant, beginning to tread the ground with the foot as hard as possible along each of the trenches, and in the same direction as planted; then with a spade levelling all the ground smooth, and running it over with a rake, taking off any stones and rubbish that may be left on the surface, so as to render it perfectly even.

The plants should be watered two or three times a week when the season is dry till they have taken root; and it will be necessary to stake the Antwerp, and other strong-growing sorts, with stout stakes, running a couple of small rails at top to tie the branches to, which will prevent their being broken by the wind, or beaten down by the rain. The Early White and smaller sorts may be plaited together at top, tying them round with the small yellow willow, which will keep them together. Some of the Early Raspberries may, he says, be planted between the trees on a west aspect, to produce early fruit before those in the quarters come in. The Antwerps thrive exeeedingly well against north walls or palings, and produces late crops. Such as are planted against walls or palings should be tacked to them, to keep them in their places.

It is advised that where any of the small red and white sorts are found they should be destroyed, planting the Large Red, the Smooth Cane Double-bearing, the Large Red and White Antwerps, the Large common White, the Double-bearing White, and Woodward's New Raspberry in their stead. In respect to the cutting or pruning of these plants, some, Mr. Forsyth says, prefer pruning them in autumn, a practice of which he by no means approves of. As they bear the fruit on the wood of the preceding year, they are, he thinks, very liable to be killed by the frost in severe winters; but, by deferring the pruning till the month of February, there will be a great choice of fine wood for bearing the following summer, being careful to root out or cut down all the wood that bore fruit the preceding year, which generally dies, selecting only from five to seven of the most vigorous and strong shoots from the last year's wood to bear fruit the ensuing season. These shoots may, he says, be pruned to the length of three or four feet, according to their strength, when they are of the Smooth Cane Double-bearing sort (which generally bears a second crop in autumn, and will in fine seasons continue bearing from June to November); but, if the Large Antwerp, the shoots should be left five or six feet long in these prunings.

In regard to the Early White, which never grows so strong as the above sorts, it should, he says, be shortened to two feet and a half, or three feet. These should be planted in rows about three feet distant from each other, and two feet from plant to plant in the rows; always remembering to keep them clear of suckers, and to cut out the dead or last year's wood, as above; making choice of the strongest shoots for bearing wood. Great care should, however, be taken not to cut off the little spurs on the sides, which bear the fruit in this kind.

Plants of this sort continue in bearing five or six years; by which time a fresh plantation should be in readiness to succeed them. The young plants often bear some fruit the first year,

Painted by Syd Edwards
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Engraved by F Sansom

1 *Rudbeckia purpurea.*
Purple Rudbeckia.

2 *Rosa lutea*
Single yellow Rose.

and come into full bearing in the second after planting. If they be suffered to remain more than five or six years on the same ground, he says, they degenerate and bear small fruit. And much care should be taken not to leave above eight or ten of the strongest shoots, rubbing off or pulling up all the superfluous ones; and keeping the ground well hoed and cleared of weeds between the rows, as well as in other places.

In the other sorts the increase may be effected by suckers, layers, cuttings, and dividing the roots, and in the two last or herbaceous kinds by seed.

The suckers should be taken up in autumn, winter, or spring, with roots; and the strongest be planted at once into the shrubbery, and the others in nursery-rows for a year or two, or till wanted for planting.

The layers should be made from the shoots, which may be done almost any time, as they readily emit roots at every joint, and become fit to plant out in the autumn following.

The cuttings should be taken off from some of the younger shoots, and divided into lengths a foot long, and planted in a shady border, either in the spring or summer season.

The roots in any of the raspberry or herbaceous sorts, when increased into large bunches, may be divided or slipped into several distinct sets, and planted out separately.

The last two sorts may likewise be raised from seeds, which should be taken from the ripened fruit, and sown in a moist situation where the plants are to remain, keeping the young plants clean afterwards.

The first species and varieties are highly useful for their fruit; for the table, preserving, and other culinary purposes.

The other sorts afford variety in the borders, clumps, and other parts of pleasure-grounds, among other hardy plants.

RUDBECKIA, a genus containing plants of the herbaceous biennial and perennial kinds.

It belongs to the class and order *Syngenesia Polygamia Frustranea*, and ranks in the natural order of *Compositæ Oppositifoliæ*.

The characters are: that the calyx is common with a double row of scales: scales flat, widish, curtailed, six in each row: the corolla compound radiate: corollets hermaphrodite, numerous, in a conical disk; females about twelve, very long in the ray: proper of the hermaphrodite, tubular-funnel-form, with a five-toothed border: female ligulate, lanceolate, with two or three teeth, flat, pendulous: the stamina in the hermaphrodites: filaments five, capillary, very short: anther cylindrical, tubular: the pistillum in the hermaphrodites: germ four-cornered: style filiform, the length of the corollet: stigma two-parted, revolute: in the females: germ very small: style none: stigma none: there is no pericarpium: calyx unchanged: the seeds in the hermaphrodites solitary, oblong, crowned with a membranaceous four-toothed rim: in the females none: the receptacle chaffy, conical, longer than the common calyx: chaffs the length of the seeds, erect, channelled-concave, deciduous.

The species cultivated are: 1. *R. laciniata*, Broad Jagged-leaved Rudbeckia; 2. *R. digitata*, Narrow Jagged-leaved Rudbeckia; 3. *R. hirta*, Hairy Rudbeckia; 4. *R purpurea*, Purple Rudbeckia; 5. *R. angustifolia*, Narrow Simple-leaved Rudbeckia; 6. *R. triloba*, Three-lobed Rudbeckia.

The first is by some divided into two species, which are thus described: the root of the former is perennial, but the stalk is annual: the lower leaves are composed of five broad lobes, deeply cut into acute points, and some of them jagged almost to the midrib; the outer lobe is frequently cut into three deep segments: the stalks rise seven or eight feet high, and divide at top into several branches; are smooth, green, and have single, oval heart-shaped leaves, some indented on their edges, others entire: the peduncles naked, terminated by a single flower with yellow rays, like the sun-flower, but smaller: the latter is also perennial, and has smooth green stalks; but they rise higher: the leaves have all five lobes, which are much narrower, end with sharper points, and are very acutely indented on their sides: the flowers are smaller, and the petals narrower. They are both natives of North America, flowering here in July.

The second species has a perennial root like the former: the leaves at bottom are composed of seven or nine lobes, some entire, others jagged to the midrib; they are of a dark green and smooth: the stalks rise six feet high, and divide into many branches; they are of a purple or iron colour, and very smooth: the stem-leaves towards the bottom are hand-shaped, and composed of five lobes; higher up they have but three lobes, and at top the leaves are single: the flowers are smaller than those of the preceding, but of the same shape and colour. It is a native of North America, flowering in August and September.

In the third, the root continues four or five years: the leaves are oblong, ovate, and hairy: the stalks rise a foot and half high, and have one or two leaves near the bottom: the peduncle is naked near a foot in length, and is terminated by one pretty large yellow flower, shaped like the sun-flower: the florets of the ray are very

stiff, and slightly indented at their points: the disk is very prominent, and of a dark purple colour. The flowers will continue six weeks, and there is a succession of them from the middle of July, till the frost puts a stop to them. It is a native of Virginia.

The fourth species is a perennial plant like the third. The leaves are longer and broader, are smooth, and have three veins: the peduncles are taller, and have two or three narrow leaves on each, placed alternately: on the top is one flower, with long narrow, reflexed, peach-coloured florets in the ray: the disk is very prominent, and of a dark purple colour: it flowers at the same time with the third, but the flowers are of not so long duration. It is a native of Carolina and Virginia.

The fifth has the root perennial: the stalks four or five feet high: the leaves narrow, smooth, opposite: the florets in the ray of the flower yellow, long, twelve in number: disk dark red: the scales of the calyx spreading and almost awl-shaped. It is a native of Virginia, flowering in August and September.

The sixth species is biennial: the lower leaves are divided into three lobes, but those upon the stalks are undivided; they are hairy, and shaped like those of the first sort: the stalks branch out on their sides, and are better furnished with leaves than the others: the flowers are very like those of the first sort, but smaller. It grows naturally in several parts of North America.

Culture.—All the sorts of these plants may be increased by offsets, parting the roots and seeds.

The offsets in the perennial sorts should be taken off and planted out in the early autumn: when the stems decay the roots may also be divided and planted out at the same time, or in the early spring months.

As these plants are often liable to go off soon, some should be frequently raised to keep up the stock; and as others have a tendency to become biennial, and decay without increasing the root, they should have the flower-stems cut down in the early summer, to encourage the growth of the root offsets, for slipping in the following autumn.

All the sorts may be raised from seed, and the biennial sorts must always be raised annually in that way; likewise such of the perennial kind as are biennially inclined, sowing the seeds in April, in a border of light earth, raking them in; and when the plants are two or three inches high, pricking them out in nursery-rows till autumn, then planting them out where they are to remain. They should have a light dry soil and rather warm situation.

They afford much ornament and variety in the borders and clumps, among other flowering plants.

RUE. See Ruta.

RUMEX, a genus containing plants of the herbaceous perennial and woody evergreen kinds.

It belongs to the class and order *Hexandria Trigynia*, and ranks in the natural order of *Holoraceæ*.

The characters are: that that the calyx is a three-leaved perianth: leaflets obtuse, reflex, permanent: the corolla has three ovate petals, bigger than the calyx, and like it, converging, permanent: the stamina have six capillary filaments, very short: anthers erect, twin: the pistillum is a turbinate-three-sided germ: styles three, capillary, reflexed, standing out between the clefts of the converging petals: stigmas large, laciniate: there is no pericarpium: corolla converging, three-sided, inclosing the seed: the seed single, three-sided.

The species cultivated are: 1. *R. acetosa*, Common Sorrel; 2. *R. scutatus*, French Sorrel; 3. *R. Patientia*, Patience Dock, or Rhubarb; 4. *R. sanguineus*, Bloody-veined Dock, or Bloodwort; 5. *R. Lunaria*, Tree Sorrel.

The first has a perennial root, running deep into the earth: the stem mostly simple, erect, round, deeply striated, leafy, from one to two feet high: the radical and lower stem-leaves on long foot-stalks, with a membranous cylindrical sheathing stipule embracing the stem and torn at the top; these leaves are arrow-shaped, blunt, entire or but little waved in their sides, but at the base cut into two or three large sharpish teeth pointing backwards, and not, as in some of the species, divaricated into a right angle with the outline of the leaf: the upper leaves sessile, gradually more entire, embracing, acute, a little rolled back; those at the top of the stem only slightly crisped at their base: a compound sort of whorled spike or branched panicle terminates the stem; its branches alternate and nearly erect: the barren flowers are on a separate plant from the fertile ones.

The whole herb is acid, with a degree of astringency, not unpleasant or unwholesome. It is often cultivated as a culinary herb.

There is a variety with broad leaves, termed Great Mountain Sorrel.

The second species has a hard, fibrous, perennial root: the stem from a foot to eighteen inches in height, very slightly angular, glaucous, smooth, dividing into alternate spreading branches: the leaves are cordate or hastate, glaucous, smooth, soft, fleshy, blunt, entire, an inch and half in length and breadth, on petioles two or three inches long, channelled within: the flowers in a sort of whorls, forming all together

spike-shaped racemes, nodding and coming out three or four together on capillary pedicels from a white sheathlet: valves subcordate, large, bright rose-colour, entire, without any grains. It is a native of Germany, &c.

This, which is called Round-leaved Sorrel, is a more grateful acid than the first sort, and of course preferred for kitchen use, in soups, &c.

The third has a large root, dividing into many thick fibres, which run downwards; the bark is brown, but the inside is yellow, with some reddish veins: the leaves are broad, long, acute-pointed, on petioles of a reddish colour: the stems from four to six feet high, dividing towards the top into several erect branches, having a few narrow leaves on them, and terminated by spikes of large flowers, which appear in June. It is a native of Italy.

The fourth species has a fusiform root: the stem is upright, branched, angular, leafy, smooth; all the leaves petioled, smooth, veined, somewhat curled about the edge: the root-leaves very large, cordate at the base: racemes terminating, spreading, almost leafless; with the flowers in alternate bundles, pedicelled, nodding.

The fifth species rises with a woody stalk ten or twelve feet high, covered with a smooth brown bark, and sending out many branches: the leaves are smooth, roundish-heart-shaped, two inches long, and an inch and half broad, alternate upon pretty long footstalks: the flowers come out in loose panicles towards the end of the branches: are of an herbaceous colour, and sometimes succeeded by triangular seeds with smooth covers; but the seeds rarely ripen in this climate. It is a native of the Canary Islands.

Culture.—The first and second sorts and varieties may be increased by seed and parting the roots, but more particularly the first, as the latter may be very readily increased by the roots. The seeds should be sown in a bed or border in the early spring, as March, raking it in evenly. When the plants come up they should be regularly thinned, and when of some growth, in the summer, be planted out in rows on a bed or border, about eight or nine inches apart in the common sort, and in the other a foot or more, watering them well; when they will be proper to cut the latter end of the same summer and in the autumn, continuing for several years; but as the seedling plants in the first kind mostly produce larger leaves than the older plants, fresh supplies should be raised annually or every other year.

The parted roots may be planted out in the same season, or in autumn, in rows a foot apart, giving them a good watering; when they grow readily, and furnish leaves in the latter end of summer and in the autumn.

The second sort is readily raised in this way. They afterwards only require to be kept clean, and to have the seed-stems cut down in the summer, as well as the rank leaves in the autumn, that more full supplies of fresh leaves may be afforded.

The third and fourth sorts may be raised also from seeds in the same way, and the former from offsets of the root planted out in the autumnal season; when they grow very readily.

The last sort is easily increased by cuttings of the young shoots in the spring and summer months, being planted in pots at the former season, plunging them in a hot-bed; but in the latter they succeed without artificial heat, either in pots or the natural ground, being occasionally shaded and watered; when they become well rooted by the autumn.

The third and fourth sorts afford variety in the clumps and borders, and the last among the green-house collections.

RUSCUS, a genus containing plants of the shrubby and under-shrubby evergreen kind.

It belongs to the class and order *Dioecia Syngenesia*, and ranks in the natural order of *Sarmentaceæ*.

The characters are: that in the male, the calyx is a six-leaved perianth, from erect-spreading: leaflets ovate, convex, with the lateral margin reflexed: the corolla has no petals, unless the alternate calyx-leaves be called so: nectary central, ovate, the size of the calyx, inflated, erect, coloured, perforated at the top: the stamina have no filaments: anthers three, spreading, placed on the top of the nectary itself, united at the base—female: the calyx is a perianth as in the male: the corolla petals as in the male: nectary as in the male: the pistillum is an oblong-ovate germ, concealed within the nectary: style cylindric, the length of the nectary: stigma obtuse, prominent beyond the mouth of the nectary: the pericarpium is a globular, three-celled berry: the seeds two, globular.

The species cultivated are: 1. *R. aculeatus*, Prickly Butcher's Broom; 2. *R. Hypophyllum*, Broad-leaved Butcher's Broom; 3. *R. Hypoglossum*, Double-leaved Butcher's Broom; 4. *R. racemosus*, Alexandrian Laurel; 5. *R. androgynus*, Climbing Butcher's Broom.

The first has the roots thick, white, twining about each other, putting out frequent fibres like those of the asparagus, oblique, striking deep in the ground: the stem suffruticose, tough, stiff,

green, round, striated, from eighteen inches to three feet in height, sending out from the sides many short branches; having many leaves on them, nearly of the same shape and size with those of myrtle, but very stiff, and ending in sharp prickly points: they are alternate, about half an inch long, and one-third of an inch broad near the base, ovate, quite entire, sessile: from the middle of the leaf above comes out a single flower, on a very short pedicel; it is small, and yellowish green or purplish; when it first appears, it is the size and shape of a small pin's head; when expanded, composed of three outer widish calyx-leaves, and three inner narrower like rays, ending in a narrow point. The female flowers are succeeded by berries, which are red, bigger than those of the asparagus, and almost as large as some cherries, of a sweetish taste; having two large orange-coloured seeds in each: the flowers come out in March and April. It is a native of the Southern parts of Europe.

The second species has the roots with large knotty heads, and long thick fibres like those of the preceding sort; from which arise many tough limber stalks near two feet high: the leaves stiff, ovate-oblong, ending in points, more than two inches long and almost one broad, placed alternately: the flowers are produced on the under surface of the leaves near the middle, sitting close to the midrib; are small and herbaceous: the female flowers are succeeded by small red berries about the size of those of juniper. It is a native of Italy, flowering in May.

The third has the root like the preceding: the stems about ten inches high: the leaves lanceolate, about three inches long, and one inch broad in the middle, drawing to a point at both ends, and having several longitudinal veins running from the footstalk to the point: they are mostly alternate, but sometimes opposite: on the middle of the upper surface comes forth a small leaf of the same shape; and at the same point, from the bosom of the small leaves, come out the flowers, which are of a pale yellow colour. The berries are almost as large as those of the first sort; are red, and ripen in winter. It is a native of Italy, &c. flowering in April and May.

The fourth species has roots like those of the other species: the stalks slender and much more pliable: they rise about four feet high, and send out many side branches: the leaves oblong, acute-pointed, about two inches long, and one-third of an inch broad, rounded at the base, smooth, of a lucid green, placed alternately, and sessile: the flowers are in long bunches at the end of the branches, of an herbaceous yellow colour: the berries like those of the first sort, but smaller, ripening in winter. It is a native of Portugal.

The fifth species sends out pliant stalks which rise seven or eight feet high, and have several short branches proceeding from their sides: the leaves are stiff, about two inches long, and one inch broad towards their base, where they are rounded to the footstalk, but they end in acute points; many longitudinal veins run from the footstalk to the point: the flowers are produced in clusters on the edges of the leaves, and are white: the berries yellowish red, not so large as those of the first sort. It differs from the other sorts in having androgynous flowers divided into six equal segments to the bottom, but falling off in one piece, and arising from the edge, and not the disk of the leaf. It is a native of the Canary Islands, flowering most part of the summer.

Culture.—They are capable of being readily increased by the roots, which send up numerous stalks or suckers which may be taken up in autumn, winter, sr spring in open weather, and divided into many separate sets each forming a proper plant, though they need not be divided very small unless where a great increase is required, planting the largest at once where they are to remain, and the smallest in nursery-rows, &c., when each plant soon increases by offsets, and assumes a bushy growth.

They are capable of being raised from seeds, but they often remain in the ground till the second spring. The seeds of the hardy sorts should be sown in any bed or border an inch deep, and the tender kind in pots, placed under shelter in cold weather; and when the plants are a year old, pricking them out in March, the hardy sorts in nursery-beds for two or three years, and the tender sorts in pots.

The different hardy sorts are proper for the verges of shrubberies, or any close plantations, as they thrive under the drip of trees, and remain green the year round.

But the last tender sort requires the shelter of a green-house in winter, where it affords variety among other potted plants.

RUSH, FLOWERING. See BUTOMUS.

RUSH, SWEET. See ACORUS.

RUTA, a genus containing plants of the undershrubby evergreen kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that the calyx is a five-parted perianth, short, permanent: the corolla has five petals, spreading subovate, concave; with narrow claws: the stamina have ten filaments, awl-shaped, spreading, the length of the

corolla, widish at the base: anthers erect, very short: the pistillum is a gibbous germ, inscribed with a cross, surrounded at the base by ten honey-dots, raised on a receptacle punctured with ten honey-pores: style erect, awl-shaped: stigma simple: the pericarpium is a gibbous capsule, five-lobed, half-five-cleft, five-celled, opening into five parts between the tips: the seeds very many, rugged reniform-angular.

The species cultivated are: 1. *R. graveolens*, Common Rue; 2. *R. montana*, Mountain Rue; 3. *R. chalepensis*, African Rue; 4. *R. patavina*, Three-leaved Rue.

The first has the root woody, branched: the stems frutescent, covered with a rugged, gray, striated bark, eighteen inches high and more: the branches, especially the young ones, smooth and pale green: the leaves glaucous, pulpy, dotted, divided like the umbellate plants, doubly pinnate, or more properly superdecompound: the leaflets obovate, sessile; the lower ones smallest; the end one commonly trifid, with the middle lobe much larger than the rest: the flowers in a branching corymb on subdivided peduncles. It is a native of the South of Europe; flowering from June to September.

The varieties are: the Common Broad-leaved Rue, the Narrow-leaved Rue, and the Variegated-leaved Rue.

The second species has the lower leaves composed of several parts, which are joined to the midrib in the same manner as other branching winged leaves, and have linear leaflets standing without order: the stalks are from two to three feet high, branching out from the bottom, and garnished with leaves divided into five parts, and those at the top into three, which are as small and narrow as the bottom leaves; are of a gray colour, but not so fetid as those of the preceding: the flowers grow at the end of the branches in loose spikes, which are generally reflexed. It is a native of the South of Europe, and Barbary, flowering in August and September.

The third is very like the first, and is its offspring: the first flowers are five-cleft, and the others four-cleft, as in that: the stem is three feet high, upright, round, very much branched: the leaves superdecompound, oblong-ovate, smallish, cinereous, smooth, strong-smelling: the flowers in a terminating panicle. It is a native of Africa.

There are varieties with broad leaves and with narrow leaves.

In the fourth species the stalk rises singly from the root, is about a foot high, and herbaceous: the leaves alternate, narrow: the stalk branches at the top in form of an umbel, sustaining many yellow flowers, composed of five entire plane petals, having no hairs on their borders: it seems to be a plant of short duration. It was found in Italy.

Culture.—All the species and varieties may be readily increased by seed, slips, and cuttings. The seed should be sown in the open ground, in March or April, on a bed of light earth, raking it in: the plants soon come up, which when two or three inches high should be planted out in nursery-rows, and watered till fresh rooted. And from the scattered or self-sown seeds of the common sort, many young plants often rise in autumn and spring, which form good plants; but by slips or cuttings is the most expeditious method of raising all the sorts, as every slip or cutting of the young wood will readily grow. It is the only method by which the different varieties can be continued distinct. The slips or cuttings should be made from the young shoots six or eight inches long, and planted in a shady border, in rows half a foot asunder, giving a good watering, and repeating it occasionally; by which they will soon emit roots below and shoots at top, so as to form little bushy plants by the autumn following.

They all afford variety in the borders and other parts, and the first sort and varieties are useful medicinal plants. The third sort should have a dry soil and sheltered situation.

SABINA. See JUNIPERUS.

SACCHARUM, a genus containing a plant of the tender perennial reed kind.

It belongs to the class and order *Triandria Digynia*, and ranks in the natural order of *Gramina*.

The characters are: that the calyx is a two-valved glume, one-flowered: valves oblong-lanceolate, acuminate, erect, concave, equal, awnless, surrounded with a long lanugo at the base: the corolla two-valved, shorter, sharpish, very tender; nectary two-leaved, very small: the sta-

mina have three capillary filaments, the length of the corolla: anthers somewhat oblong: the pistillum is an oblong germ: styles two, feathered: stigmas plumose: there is no pericarpium: corolla invests the seed: the seed single, oblong.

The species cultivated is *S. officinarum*, Common Sugar-cane.

It has a jointed root, like that of other sorts of cane or reed: from this arise four, five, or more shoots, proportionable to the age or strength of the root, eight or ten feet high, according to the goodness of the ground: in some moist rich soils, canes have been measured near twenty feet long; but these are not near so good as those of middling growth; abounding in juice, but having little of the essential salt: the canes are jointed, and these joints are more or less distant, in proportion to the soil: a leaf is placed at each joint, and the base of it embraces the stalk to the next joint above its insertion, before it expands; hence to the point it is three or four feet in length, according to the vigour of the plant; there is a deep whitish furrow or hollowed midrib, which is broad and prominent, on the under side; the edges are thin, and armed with small sharp teeth, which are scarcely to be discerned by the naked eye, but will cut the skin of a tender hand, if it be drawn along it: the flowers are produced in panicles at the top of the stalks; are from two to three feet long, and composed of many spikes nine or ten inches in length, which are again subdivided into smaller spikes: these have long down inclosing the flowers, so as to hide them from sight: the seed is oblong pointed, and ripens in the valves of the flower. It is a native of both the Indies, and the Islands of the South Seas.

There are three remarkable varieties mentioned by Loureiro, differing in the culm, not in the flower: the White Sugar-cane, with the culm long, white, of a middling size, very sweet, the knots distant; the Red Sugar-cane, with the culm short, thicker, red, very juicy, the knots approximate; the Elephantine Sugar-cane, with the culm very thick, red, long, less sweet, the knots approximate: and there are, probably, no others in a plant so much cultivated.

Culture.—This plant is capable of being increased by slips or suckers from the root, and by cuttings of the main stalks; but here generally by slips from the bottom; or any side-shoots arising from the stems near the root, having earth raised about the bottom part will soon emit fibres, and be fit for separation: the slips or offsets may be taken off at any season in which they appear fit for the purpose, being careful to detach them with some fibres to each, and plant them separately in pots of rich earth, plunging them in the bark-bed, watering and occasionally shading them till they have got root, retaining them always in the bark-bed in the stove, treating them as other exotics of that sort.

They afford variety among other stove plants.

SAFFLOWER. See CARTHAMUS.

SAFFRON. See CROCUS.

SAGE. See SALVIA.

SAGE OF JERUSALEM. See PHLOMIS.

SAINT ANDREW'S CROSS. See ASCYRUM.

SAINT BARNABY'S THISTLE. See CENTAUREA.

SAINT JOHN'S BREAD. See CERATONIA.

SAINT JOHN'S WORT. See HYPERICUM.

SAINT PETER'S WORT. See HYPERICUM.

SALIX, a genus containing plants of the deciduous tree aquatic kind.

It belongs to the class and order *Dioecia Diandria*, and ranks in the natural order of *Amentaceæ*.

The characters are: that in the male the calyx is an ament oblong, imbricate every way, constructed of an involucre from the bud, consisting of scales one-flowered, oblong, flat, spreading: there is no corolla: petals none: nectary a gland cylindric, very small, truncate, melliferous, in the centre of the flower: the stamina have two straight, filiform filaments, longer than the calyx: anthers twin, four-celled—female: the calyx ament and scales as in the male: there is no corolla: the pistillum is an ovate germ, attenuated into a style scarcely distinct, a little longer than the scales of the calyx: stigmas two, bifid, erect: the pericarpium is an ovate-subulate capsule, one-celled, two-valved: valves revolute: the seeds numerous, ovate, very small, and crowned with a simple hirsute pappus or down.

The species cultivated are: 1. *S. triandra*, Long-leaved Three-stamened Willow; 2. *S. pentandra*, Bay-leaved Willow; 3. *S. vitellina*, Yellow Willow; 4. *S. amygdalina*, Broad-leaved Three stamened Willow; 5. *S. hastata*, Halbert-leaved Willow; 6. *S. fragilis*, Crack Willow; 7. *S. Babylonica*, Weeping Willow; 8. *S. purpurea*, Bitter Purple Willow; 9. *S. Helix*, Rose Willow; 10. *S. fissa*, Basket Osier; 11. *S. rubra*, Green Osier; 12. *S. caprea*, Round-leaved Sallow; 13. *S. cinerea*, Cinereous-leaved Sallow; 14. *S. alba*, White Willow; 15. *S. viminalis*, Osier.

The first is naturally a tree thirty feet or more in height, but being one of the best osiers for the use of basket-makers is generally cut and

kept low: the bark of the stem and branches peels off spontaneously, almost like that of the plane-tree: the branches are upright, long, slender, pliable and tough, though somewhat brittle at their insertion; their bark is brownish and smooth: their leaves about three or four inches long, tapering away towards the base, and the breadth on each side the nerve is as nearly equal as possible; they terminate in a point; their margin is thickly serrate, the serratures incurved and rounded, a little glandular; both sides smooth, the under rather glaucous. Mr. Curtis remarks that it is not usual for willows to flower both in spring and autumn, but he has frequently found this species to do so. It is a native of many parts of Europe.

It may be admitted into ornamental plantations, the male catkins being very numerous, of a bright yellow colour, and of an agreeable scent: the male tree should on this account be preferred for ornament; and also because the females quickly shed their catkins and make a litter.

The second species is sufficiently well known by its broad odoriferous leaves, the serratures of which exude a copious yellow resin, and its numerous stamens, commonly about five to each flower. It frequently grows to a tree ten or twelve feet high, with a trunk as large as a man's thigh: the twigs are of a reddish colour tinged with yellow: the leaves are stiff, shining smooth on both sides, finely serrate with close numerous cartilaginous teeth; when full grown they are about three inches long, and an inch and half wide: their footstalks are short, broad, and sprinkled with glands: each scale in the male catkin has usually five stamens, but often six, and sometimes seven. These catkins are very sweet-scented. It is a native of Britain, &c.

The third is a middle-sized tree, much branched at the top: branches upright: the bark gray, chopped, cinnamon-coloured within, bitter and astringent: the female trees, when left to themselves, have pendent branches, but when lopped are stiff and straight: male catkins at first upright, then turned down; cylindrical, slender, serpentine, two inches long or more; on fruitstalks half an inch long: nectaries two: stamens two: female catkins from two to three inches in length, on fruitstalks from an inch to an inch and half long: the leaves alternate, upright, slightly serrate, with a yellowish midrib; they are about three inches long and one inch broad, but always broader in the female tree: the male tree is generally smaller and less common than the female. It is a native of the more temperate parts of Europe.

The shoots are used by basket-makers: the wood is white and very tough: the cotton will make ordinary paper, and may serve some of the purposes of genuine cotton: the bark may be used in dyeing, and medicinally in agues.

The fourth species never rises into a tree: the bark is deciduous: the leaves are shorter than in the first sort, scarcely two inches long, of a broadish ovate figure rounded at the base, by no means linear; oblique, the width of the two sides being unequal: the stipules are remarkably large, varying from a roundish to a half-heart-shaped form, crenate, deciduous: female flowers and capsules much as in that sort. It is a native of several parts of Europe.

The fifth is distinguished by its sessile ovate smooth leaves, sharply and very finely but scarce apparently serrate; and its subcordate stipules. It becomes a tree, but never tall: the branches are round, very straight, cinereous: the leaves hard, with very minute and scarcely visible serratures, cinereous beneath, but smooth on both sides, rigid, appendicled with two ovate entire leaflets. It is a native of Lapland, &c.

The sixth species grows to be one of the largest trees of the kind: the branches break off easily at the shoot of the preceding year: the leaves are large, four inches long, an inch and half broad, distinctly and deeply serrate, smooth and shining on the upper side, glaucous underneath: the stipules scarcely any, but instead of them the footstalks are dotted with prominent glands: the catkins have two or three fugacious leaves at the base of the peduncle. It is a native of the greater part of Europe, especially the northern parts, and is of quick growth, soon forming a shade in wet places; the males are fittest for this purpose. Bees are fond of the male flowers.

The seventh grows to a considerable size, as four feet and a half in circumference at three feet above the ground, and thirty feet in height. It is generally esteemed for its long slender pendulous branches, which give it a peculiar character, and render it a beautiful object on the margin of streams or pools: the leaves minutely and sharply serrate, smooth on both sides, glaucous underneath, with the midrib whitish; on short petioles: the stipules, when present, roundish or semilunar and very small; but more frequently wanting, and then in their stead a glandular dot on each side: the catkins axillary, small, oblong: in the male the filaments longer than the scale, with two ovate erect glands fastened to the base: the female, on two leaved peduncles, scarcely longer than half an inch. It is a native of the Levant.

The editor of Miller's Dictionary remarks that in No. 6817, Aug. 25 to 27, 1801, of the St.

James's Chronicle, there is the following paragraph, but on what authority he is not acquainted:—"The famous and admired weeping willow, planted by Pope, which has lately been felled to the ground, came from Spain, inclosing a present to the late Lady Suffolk. Mr. Pope was in company when the covering was taken off; he observed that the pieces of stick appeared as if they had some vegetation, and added, Perhaps they may produce something we have not in England.' Under this idea he planted it in his garden, and it produced the willow tree that has given birth to so many others."

The eighth species is a bushy shrub three or four feet high, with long slender tough purple shining branches: the leaves some opposite, others alternate, nearly linear, but broadest upwards, serrate chiefly towards the summit, very smooth, glaucous beneath, destitute of stipules: the male catkins are very slender, scarcely an inch long, nearly sessile, consisting of many thick-set flowers, the uppermost of which expand first: the scales black at the tip, hairy: nectary a solitary gland opposite to each scale: the stamen one solitary simple, never dividing, bearing an orange-coloured double or four-lobed anther: the female catkins exactly like the male in size and form. It is particularly distinguished by the length as well as delicate slenderness of its twigs, and its subglaucous spurge-like leaves, but above all by their extreme bitterness when chewed. It is a native of many parts of Europe.

The ninth rises to the height of nine or ten feet, and is a small slender tree: in the form of its leaves it differs from the eighth, being more truly lanceolate and taper-pointed, by no means obovate: the female catkins are somewhat longer, and twice as thick, and stand on longer stalks: the germ is sessile, ovate and silky; but the style is considerably lengthened out, quite smooth and naked: the stigmas also, instead of being short and ovate, are linear and considerably elongated: the leaves are less glaucous beneath and not so bitter: the rose-like excrescencies are more common at the ends of the branches in it; whence its name of Rose-Willow. It is a native of many parts of Europe.

The tenth species is a shrub four or five feet high, with upright flexible and very tough branches, of a yellowish ash-colour, often purplish: the leaves alternate, on footstalks, two or three inches long, minutely toothed or somewhat serrate, principally towards the top; smooth on both sides except when very young; dark green above, glaucous beneath: the stipules none: the catkins on short stalks, cylindrical, blunt, first red, then yellow, flowering first at the top. It is a native of some parts of Europe on the sandy banks of rivers, flowering in April.

With us it is cultivated in the fens, and preferred to all other willows or osiers for basket-work.

The eleventh is a shrub which has the branches very long, slender, tough, smooth, gray or purplish: the leaves about four inches long when full grown, slightly toothed or serrate, by no means entire, of a bright green on both sides, smooth in general, but sometimes sprinkled with a few slender hairs beneath: the stipules, if present, linear-lanceolate, a little toothed; but generally wanting. It appears to be little known, though amongst the most valuable as an osier. It is a native of this country, &c.

The twelfth species often becomes a large tree: the branches when young palish, downy: the leaves slightly tapering to a point at both ends, above green and scarce sensibly downy, underneath pale green with a very thin woolliness: edge marked with some notches which are scarcely apparent unless carefully examined, but from the middle downwards evidently waved: the lower buds produce leaves, the upper ones catkins not leafy. It is useful for bees, as flowering early.

The thirteenth is more than six and sometimes near twelve feet high; in exposed boggy grounds spreading more, but not rising so high: the leaves alternate, rude, rugged, wrinkled and green above, beneath rough with hairs, the veins indistinct, the edge serrate, on loose petioles two lines in length: stipules in shape of half a heart, on each side serrate with three glands: the catkins brownish, placed below the leaves, on a peduncle with a few small spear-shaped leaflets. It is the common Sallow, and a native of Europe, flowering in April.

The fourteenth species, when suffered to grow without lopping, becomes a large and lofty tree: it is of quick growth, but when lopped soon decays: the trunk is straight with a gray rough bark full of cracks: the branches numerous, upright, but diffused, gray or brownish green, the upper ones often dusky red: the inner bark is green: the leaves sharply and elegantly serrate; shining but pubescent above, white and silky underneath: the male catkins cylindrical, blunt, from an inch and half to two inches in length, four lines in breadth, on peduncles half an inch long: the stamens two: the nectaries two, one before the stamens obcordate, the other behind them oblong: the female catkins slender, cylindrical, two inches long, three or four lines broad, on peduncles near an inch in length. It

is a native of Europe, flowering in April and May. Its wood is white, light, and tough.

The fifteenth is a very tall, slender, obsequious, quick-growing shrub: the leaf and flower-buds distinct: the leaves rolled back at the edges before they unfold. It is frequently arborescent: the bark grayish, smooth, with here and there a crack: the branches very long, straight, slender, tough: the leaves, especially the lower ones, a span long or more, waved at the edge: the male catkins ovate or oblong, from an inch to an inch and half in length, three or four lines in breadth, on very short peduncles: stamens two: nectary one: the female catkins ovate-oblong or cylindrical, of the same length with the male, half an inch broad; peduncle two lines long: the leaves being silvery underneath, the nectary in the male flower being long and slender, and the style in the female flower being very long, are sufficient marks to distinguish it by. It is a native of most parts of Europe. It is the true Osier.

There are a vast number of varieties in cultivation for the uses of the basket-maker. Evelyn has enumerated three vulgar sorts: one of little worth, being brittle, and very much resembling the Sallow, with reddish twigs, and more greenish and rounder leaves: a second, called Perch, of limber and green twigs, having a very slender leaf: the third totally like the second, only the twigs not altogether so green, but yellowish. This is the very best, he says, for use, tough and hardy. The most usual names applied to them by basket-makers about London are: the Hard-Gelster, the Horse-Gelster, Whyning, or Shrivelled-Gelster, Black-Gelster, in which Suffolk abounds. Then the Goldstones, the Hard and Soft, Brittle and worst of all the Goldstones; the Sharp and Slender-topped Yellow Goldstone; the Fine Goldstone. Then there is the Yellow Osier, the Green Osier, the Snake or Speckled Osier, Swallow-tail and Spaniard. To these, the editor of Miller's Dictionary says, may be added the Flanders Willow, which will arrive to be a large tree—with these coopers tie their hoops to keep them bent. Lastly, the White Swallow, used for green-work; and if of the toughest sort, to make quarter can-hoops. It is further suggested, that innumerable varieties are cultivated in the osier-grounds for the basket-makers; and the same frequently under different names in different places, so that it would be difficult and of little use to enumerate them; but that the Dutch and Wire Osiers are esteemed about London. The true Velvet Osier, which is a valuable sort, has, it is said, been made out to be distinct from the *viminalis*,

Culture.—All these plants are capable of being readily increased by cuttings of the young shoots of one or two years old, in lengths of half a yard or two or three feet; and those of several years growth in truncheons or sets, of from three or four to five or six feet long, according to the purposes for which they are designed, which strike root most readily in low moist soils. The proper season for planting them out is any time in open weather, from the beginning of autumn till March; but the early autumn and spring months are the best, according as the soil may be more moist. In the planting, a long iron-shod dibble is used for the smaller cuttings, and an iron crow for making holes for the larger sets, or holes may be made with a spade for very large long pole-cuttings; though some use no instrument in planting the smaller cuttings, but sharpen the ends of them, and thrust them into the ground, especially in soft land; but as this method is apt to force off the bark from the lower part of the cutting, it is best to cut the bottom of each cutting even, and plant them with some instrument in the above manner.

These sets are planted for different purposes; as for timber trees—to form osier grounds—to cut for poles,—for pollards for lopping, &c.

When they are intended to be raised for timber, the larger growing sorts, such as the white-yellow, and purple, or red willows, &c. should be chosen, taking cuttings of the strong young shoots, which should be planted at once where they are to remain, in any low marshy, or rather moist situation, where they grow with great rapidity. The ground should be prepared by proper digging, or ploughing, as may be most convenient, and then a quantity of cuttings of the strong young shoots, of one or two years' growth, cut to half a yard or two feet lengths, should be provided and planted in rows, only six feet asunder, and three or four distant in the rows, that they may draw each other up fast in growth, and allow for a gradual thinning, each cutting being inserted two parts of three into the ground. They soon emit roots, and shoot strongly at top in spring and summer; but to have them run up with clean stems for full standards, all should be cleared away but one of the strongest leading shoots for a stem, which should be suffered to run up at full length in its future growth. After a few years, when the trees approach one another, they should be thinned for poles, &c.; repeating the thinning a few years afterwards, according as the branches of the different trees interfere, leaving them at last about twelve or fifteen feet asunder, to attain their full growth: in this way they draw each other up very expeditiously with straight handsome stems, to forty

or fifty feet in height, or more; and in twenty or thirty years become fit to sell as timber.

When intended to form osier grounds for low stools, for producing twigs annually for the basket-makers, they should be planted in rows two or three feet asunder, and be always kept to low stools a foot high, in order to force out a more plentiful annual crop of twigs and rods, proper for use in one summer's growth. For this purpose, waste boggy land in the sides of large rivers are the most proper, both in respect to the soil, and the conveyance of the wands.

These situations should be dug over or ploughed, for the reception of the osiers: then, in the proper season, as above, a sufficient quantity of osier sets of different sorts, in cuttings of the one or two years old shoots, should be formed into two feet or two feet and half lengths, planting them in lines two feet and half distance, inserting each cutting from ten or twelve to fifteen inches into the ground, leaving the rest out to form the stool, and let them be two feet and half distant in each row: having thus formed the plantation, the cuttings will root firmly in the spring, and shoot at top tolerably strong in summer, each stool generally throwing out several shoots, of an erect growth. During the first summer, all large weeds should be kept down, that the stools may have full scope to produce the first shoots as strong as possible, which, by the end of autumn, will probably be advanced some considerable length; and if much wanted may be cut in the following winter or spring; but for full plantations they should generally be suffered to continue their growth for two years, till the stools are firmly rooted and become strong; then be cut down with all the tops close to the heads of the stools, which serve for poles, &c. Next year the stools shoot out strong, a numerous crop of twigs and rods, fit for cutting for the basket-makers in the winter following; and the stools still remaining, continue to furnish an annual crop fit for cutting every winter: the twigs when cut should be sorted in sizes, tied in bundles, and stacked up for use.

Where intended to cut for poles, the plantations of stools may be made in any waste watery situations, as along the sides of brooks, rivers, watery ditches, and other similar situations; to cut every three, four, five, or six years, according to the purposes for which they may be employed.

In forming them, a quantity of sets, of two years old shoots, in cuttings about two feet and half long, should be provided, and planted in rows a yard asunder, introducing each cutting two parts of three into the ground; they readily grow, and each sends out several erect shoots, which, in three or four years, will become large poles fit to be cut for use.

Large cuttings or truncheons, three or four feet long, may likewise be thrust down along the sides of rivers, brooks, ditches, &c. which will often take root, and shoot out strongly at top for poles.

When designed for pollard standards to cut over for poles, for hurdles, &c. also for fuel, every fifth, sixth, or seventh year, the sets or cuttings may be obtained in plenty from the loppings of any old pollard willows, &c. choosing the large straight poles, cut from about seven or eight to nine or ten feet lengths, which should be planted either with an iron crow, or some other similar implement, forced into the ground to make wide holes, two feet or two and a half deep, for their reception: or, if the ground be stubborn, the holes should be dug with a spade to that depth, planting one set in each hole, placing them from a foot and half at least to two feet and half in the ground, leaving six, seven, or eight above for the stem: these sets, though so large and long, if planted in moist places, readily strike root, and shoot out at top the following spring and summer, into many erect branches, which, after four or five years growth, become fit to lop for poles, &c. The trees thus continue to afford a lopping as above, or may be suffered to grow larger, according to the purposes for which the loppings may be wanted.

When for the purpose of forming hedges quickly, either as fences, blinds, or shelter, cuttings, either of strong young shoots, formed in two or three feet lengths, and planted in a row half a foot asunder, and twelve to fifteen or eighteen inches deep, may be employed, or larger truncheons of several years growth, cut into sets, two, three, four, or five feet long or more, be used: in either case, when the sets have made the first year's shoot, the shoots may be plashed together in winter, both to stiffen the hedge and give it a thicker form, and afterwards be kept regular by clipping it annually, or suffered to take its own natural growth.

But, in order to form a willow hedge as quickly as possible, large straight sets of five or six feet long may be used, planting them chequer-ways, placing each set half a yard in the ground, leaving three or four feet above; which, being arranged, cross one another in the above manner; and ranged all of an equal height, they at once form a good firm fence.

And where a speedy fence is wanted, by way of blind or shelter, a quantity of loppings, five, six, or seven feet long, well furnished with lateral branches to the bottom, may be provided and

planted in a deepish trench, pretty close together, which soon grow, and form a sort of fence immediately.

When for twigs for garden uses, a moist situation should be chosen, and a quantity of the most pliant kind of osier sets, or cuttings of the young shoots, half a yard or two feet long, should be provided and planted in rows, two parts of three into the ground. They grow freely, and furnish plenty of twigs every year, managing them as those in the osier plantations.

The after-culture in all these cases is principally the keeping down large weeds the first and second years after planting, but which is more particularly necessary in the plantations of young low cuttings, till they are a little advanced in their growth.

When intended for nursery collections, all the different sorts should be kept, being raised from young cuttings of a year or two old, in half-yard or two feet lengths, and planted in rows, two or three feet asunder, to grow till wanted for use.

Some of these sorts of willows may be used with good effect, as ornamental trees on the sides of ponds or other places, especially white, yellow, purple, sweet, almond-leaved, and weeping kinds, being disposed thinly in large out-plantations; but the Babylonian or Weeping Willow, for its curious pendulous growth, demands attention in a particular manner, and should be disposed singly, or detached, both by the side of water, and in spacious openings of grass ground, also near grottoes, cascades, caves, ruins, &c.

SALLAD HERBS, the different sorts of esculent plants from which herbs for sallads are collected. These by different sowings, plantings, &c. are obtained at all times of the year; but the most generally esteemed sorts may be comprised under the heads of Large, Small, and Occasional Sallad Herbs.

The first consist chiefly of the different sorts of lettuces; the different sorts of endive, and all the varieties of celery, which sorts are in the best perfection for use when arrived at the full growth; any of which may be eaten as a sallad alone, or all mixed together, or with a proper quantity of small sallading, especially in winter and spring; as the small sallading being of a warm nature renders the sallad more grateful and wholesome. Lettuces are generally esteemed most in summer, when full grown and firmly cabbaged, but may be used at all seasons. The endive and celery are excellent for autumn and winter sallads, being in full perfection from September to the end of November, when they are full grown and finely blanched, and often continuing in tolerable perfection all winter and spring. See LACTUCA, CICHORIUM, and APIUM.

The second sorts are cresses, mustard, radish, rape, and some others; in all of which herbs, the young leaves are the useful parts for the purpose of sallad, and are always in the best perfection when quite young, as a few days, or a week old at most, while in their first leaves; cutting them up, stalks and top together, close to the ground, as when used thus quite young they eat exceeding tender, with an agreeably warm relish, but become too hot by age. See SMALL SALLAD HERBS.

The last sorts are principally corn sallad, or lamb's lettuce—purslane—spear-mint—water-cress—borage and borage-flowers—nasturtium-flowers and the young leaves—chervil—burnet, and sometimes red-cabbage—radishes—red beet-root—finochia, or Azorian fennel—sorrel—tarragon—young onions—cives—and sometimes horse-radish, incorporated with other herbs; most of which sorts are occasionally used in composition with other sallad herbs, and some alone as a sallad, such as red-cabbage, water-cress, young borage, &c. See their respective genera.

SALLOW. See SALIX.

SALSOLA, a genus containing a plant of the shrubby evergreen kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Holoraceæ*.

The characters are: that the calyx is a five-parted perianth: segments ovate, concave, permanent: there is no corolla, unless the calyx be called so: the stamina have five very short filaments inserted into the segments of the calyx: the pistillum is a globular germ: style three-parted or two-parted, short: stigmas recurved: the pericarpium is an ovate capsule, wrapped in the calyx, one-celled: the seeds single, very large, spiral.

The species cultivated is *S. fruticosa*, Shrubby Saltwort, or Stone-Crop Tree.

It has the stem about two feet high or more, woody, erect, round, very much branched; the branches also erect, and thickly clothed with alternate, sessile, semi-cylindrical, bluntish, fleshy, even, almost upright, rather glaucous leaves: the flowers inconspicuous, axillary, sessile, solitary, green; with three small, concave, scariose bractes. The leaves have an herbaceous flavour, with a slight degree of salt and some acrimony. It forms an elegant evergreen shrub, flowering in July and August. It is a native of France, &c.

Culture.—This plant may be increased by layers or cuttings, though with difficulty in the latter method.

The young branches should be laid down in the spring, and when well-rooted, in the following autumn, be taken off and planted out where they are to remain, a warm sheltered situation being provided for the purpose.

Though these plants are inhabitants of the sea shores, they may be introduced in the borders and clumps of the shrubbery with other evergreens.

SALVIA, a genus containing plants of undershrubby, herbaceous, and shrubby kinds.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leafed perianth, tubular, striated, gradually widening and compressed at the top: mouth erect, two-lipped; lower lip two-toothed: the corolla one-petalled, unequal: tube widening at the top, compressed; border ringent, upper lip concave, compressed, curved inwards, emarginate; lower lip wide, trifid, middle segment larger, roundish, emarginate: the stamina have two filaments, very short; two threads are fastened transversely to these almost in the middle, on the lower extremity of which is a gland, on the upper an anther: the pistillum is a four-cleft germ: style filiform, very long, in the same situation with the stamens: stigma bifid: there is no pericarpium. Calyx very slightly converging, having the seeds in the bottom of it: the seeds four, roundish.

The species cultivated are: 1. *S. officinalis*, Garden Sage; 2. *S. grandiflora*, Broad-leaved Garden Sage; 3. *S. triloba*, Three-lobed Sage, or Sage of Virtue; 4. *S. sclarea*, Common Clary; 5. *S. argentea*, Silvery-leaved Sage or Clary; 6. *S. verbenaca*, Vervain Sage or Clary; 7. *S. Indica*, Indian Sage or Clary; 8. *S. Horminum*, Red-topped Sage or Clary; 9. *S. glutinosa*, Yellow Sage or Clary; 10. *S. Mexicana*, Mexican Sage; 11. *S. Canariensis*, Canary Sage; 12. *S. Africana*, Blue-flowered African Sage; 13. *S. aurea*, Gold-flowered African Sage; 14. *S. pomifera*, Apple-bearing Sage; 15. *S. formosa*, Shining-leaved Sage.

The first is a branching shrub, about two feet in height: the younger branches are tomentose and whitish: the leaves are wrinkled, cinereous white or tinged with dusky purple, on very short petioles, sometimes eared at the base: the flowers terminating, in long spikes composed of six-flowered whorls, approximating, yet distinct. It is a native of the South of Europe and Barbary.

The varieties are: the Common Green Sage, the Wormwood Sage, the Green Sage with a variegated leaf, the Red Sage, the Red Sage with a variegated leaf, the Painted or Parti-coloured Sage with red leaves striped with white, or white red and green mixed, found, says Johnson, "in a country garden by Mr. John Tradescant, and by him imparted to other lovers of plants." There is also Spanish or Lavender-leaved Sage, in which the leaves are linear-lanceolate, very narrow and quite entire, in clusters on the side of the stalks; they are very hoary, and the branches are covered with a hoary down: the leaves on the upper part of the stalk are narrower than those of Rosemary; the flowers grow in closer spikes, and are of a light blue colour.

But the variety with red or blackish leaves is the most common in cultivation; and the Wormwood Sage is in greater plenty than the common green-leaved Sage.

In the second species the stalks do not grow so upright as those of the common Sage; they are very hairy, and divide into several branches: the leaves are broad, woolly, on long petioles, serrate, and rough on the upper surface: the leaves on the flower-stalks are oblong-ovate, on shorter petioles, and very slightly serrate: the whorls are pretty far distant, and few flowers in each; they are of a pale blue, and about the same size with those of the common sort. It flowers in June, and in good seasons the seeds ripen in autumn. This sage is preferred to all the others for tea. It is often called Balsamic Sage.

The third has the leaves narrower than those of the common sort; they are hoary, and some of them are indented on their edges towards the base, which indentures have the appearance of ears. The spikes of flowers are longer than those of the two preceding sorts, and the whorls are generally naked: the flowers are smaller, and of a deeper blue than those of the Common Sage. It is a native of the South of Europe.

The fourth species has the lower leaves large, in good ground seven or eight inches long, and four broad at the base, ending in blunt points: the stems large and clammy, about two feet high, with leaves of the same shape, but smaller, and sending out small opposite side branches: the flowers in loose terminating spikes, composed of whorls, of a pale blue colour. It is biennial, and a native of Syria, &c. flowering from July to September.

It is observed, that "a wine is made from the herb in flower boiled with sugar, which has a flavour not unlike Frontiniac."

The fifth has the leaves of a thick consistence, having several irregular indentures on their borders: the stem near a foot and half high, sending out two or four branches near the bottom, which grow erect: the whorls of flowers large,

towards the top barren. It is a native of the island of Candia, and biennial, flowering in June.

The sixth has a perennial brown root, the thickness of the middle finger, striking deep into the earth, and furnished with numerous fibres: the stems nearly upright, two feet high, set with horizontal somewhat viscid hairs, purplish, especially at the joints: the root-leaves on long petioles, varying in form, oblong, rounded at the end, sometimes a little pointed, not unfrequently heart-shaped at the base, but more commonly the leaf runs down on each side the footstalk, and to a greater length on one side than on the other, very slightly hirsute, on the margin irregularly waved and serrate or toothed, paler beneath, veiny and marked with small glandular concave dots: stem-leaves somewhat remote, the lowermost on short footstalks, the uppermost sessile: the flowers in whorls, almost naked, containing about six flowers. It is a native of all the four continents, flowering during the whole summer from June, and even in October.

The seventh has the lower leaves heart-shaped, acutely crenate, of a thick consistence, seven or eight inches long, and four broad at the base, where they are eared: the stem four feet high, having two or three pairs of smaller leaves on the lower part at the joints: the upper part, for the length of two feet, has whorls of flowers, at two or three inches distance from each other, without any leaves under them: the calyx is hairy and blunt: the helmet of the corolla arched, erect and blue, terminating in a blue point; the two side segments of the under lip are of a violet colour; the middle segment, which is indented at the point, is white, and curiously spotted with violet on the inside; the two side lobes turn yellow before the flower drops. It is a native of India, flowering from May to July.

The eighth has the stems erect, about a foot and half high: the leaves shaped like those of the common Red Sage, gradually diminishing in size to the top: the stems have whorls of small flowers, and are terminated by clusters of small leaves, and forming two varieties; one with purple and another with red tops. For the sake of this coma they are preserved in gardens for ornament. They flower in June and July, and their seeds ripen in the autumn. It is a native of the South of Europe.

The ninth has an abiding root, composed of strong woody fibres: the leaves four inches long, and three broad at the base, of a pale yellowish green colour, upon footstalks three or four inches long: the stems strong, near four feet high, having smaller leaves below, and the upper part closely set with whorls of large yellow flowers. The whole plant is very clammy, and has a strong scent, somewhat like common Garden Clary. The flowers are used in Holland to give a flavour to the Rhenish wines. It is a native of Germany, &c. flowering from June to November.

The tenth has the stem shrubby, eight or ten feet high, sending out slender four-cornered branches of a purplish colour: the leaves thin, pale green, and hairy on their under side, on long slender footstalks: the flowers in close thick spikes at the end of the branches, having a fine blue colour. It is a native of Mexico, flowering from May to July.

The eleventh has the stem shrubby, five or six feet high, dividing into many branches covered with a flocky down: the leaves three inches and a half long, and an inch and half broad at the base, where are two acute angular ears: petioles long and woolly: the top of the stalk branches out into many footstalks, forming a sort of panicle: the flowers are of a light blue colour, and are ranged in whorled spikes, having two small leaves under each whorl. It is a native of the Canary Islands, flowering from June to September.

The twelfth rises with a shrubby stalk four or five feet high, dividing into branches: the leaves are ovate, of a gray colour: the flowers come out in whorls towards the end of the branches; they are of a fine blue colour, larger than those of the common Sage, appear in succession most of the summer months, and those which come early are often followed by seeds ripening in autumn. It is a native of the Cape.

The thirteenth also rises with a shrubby stalk seven or eight feet high, covered with a light-coloured bark, sending out branches the whole length which grow almost horizontally: the leaves are of a gray colour: the flowers, in thick short spikes at the end of the branches, are very large, and of a dark gold colour. It is a native of the Cape, flowering from May to November.

The fourteenth has the stem shrubby, four or five feet high, dividing into several branches: the flowers of a pale blue colour: the branches have often punctures made in them by insects, producing protuberances as big as apples, in the same manner as galls upon the Oak, and the rough balls upon the Briar. It is remarked by Martyn, that the common Sage has the same excrescences in the island of Candia or Crete, and that they carry them to market there under the name of Sage Apples. It was found at Candia.

The fifteenth has the stem suffruticose, the height of a man, upright, brachiate, somewhat knotty, loosely chapped, ash-coloured: the

branches and branchlets opposite, spreading, four-cornered, naked at the base, rufous: shoots four-grooved, green at the top, clammy: the leaves spreading, acute (in the garden bluntish), crenate-serrate, somewhat wrinkled, veined, with the midrib and veins prominent only beneath, subcoriaceous, greenish, but paler on the back: petiole scarcely half as long as the leaf, round on one side, grooved on the other: flowers very many, from the axils of the shoots, in a sort of whorl, in the garden commonly five together, the two lower of which are later: they are on short, spreading, one-flowered peduncles, jointed at the top. It is a native of Peru, flowering most part of the summer.

Culture.—These plants are in most of the sorts raised without much difficulty.

Culture in the Sage Kind.—This in all the varieties may be effected by slips or cuttings of the young shoots from the sides of the branches, sometimes also by bottom rooted off-sets, and likewise by seed. Slips both of the former and same year's growth may be used.

Those of the first sort may be employed in April, but the latter not till May, or later: these, however, most readily strike root, and assume a free growth.

In either case, moist weather should be chosen; and having recourse to some good bushy plants, a proper quantity of the outward robust side shoots, about five, six, or seven inches long, should be slipped off, trimming off all the lower leaves, then planted out in some shady border, with a dibble, in rows half a foot asunder, putting them down almost to their tops, giving water directly, to settle the earth close, as well as to promote an early emission of root-fibres, and repeating the waterings occasionally in dry weather: the slips in general soon emit fibres, and shoot freely at top: when they have a tendency to spindle up with slender shoots, or run up to flower, it is proper to top them short in order to force out laterals below, to assume a bushy growth: they mostly form tolerably bushy plants by the autumn, when, or in the spring following, they may be removed, with balls of earth about their roots, and planted where they are to remain, either in four-feet beds, or in continued rows, a foot and half asunder, if designed as a close plantation for use: those designed for the pleasure-ground should be disposed in the borders, &c. so as to afford variety.

Where there are rooted off-sets, they may be slipped off separately with the fibres to them, either as the plants stand in the ground, or the bunches of plants taken up and divided into as many separate slips as are furnished with roots, being planted out at once where they are to remain.

The plants raised from young slips generally form the strongest and most bushy plants.

In raising these plants from seed, which is but seldom practised, it should be sown in April, in a bed of light rich earth, raking it in: the plants soon come up; and when about two or three inches high, should be pricked out, the strongest in nursery rows, half a foot asunder, to gain strength till the autumn or spring following, and then planted out with balls where they are to stand.

In the after-culture of this species and varieties, all that is requisite is the keeping them clean from weeds in summer, cutting down the decayed flower-stalks in autumn, and slightly digging between the rows in the same season, to keep them clean and decent during the winter, &c. But where this digging is not done in the autumn it should not be omitted in the spring.

The leaves of the Sage should be gathered with care and attention, not to cut the tops too close, to render the plants naked and stubby, especially when late in autumn and winter; in which they would be more liable to suffer from severe frost than when the head is preserved somewhat full and regular: besides, in this state the plants continue longer in a prosperous free growth.

When, in any old plantation, naked, stubby, or decayed parts occur, they should be cut out, and any straggling irregular growths reduced to order by occasional pruning in spring or summer, by which the plants will more readily emit fresh shoots and form full heads.

Fresh plantations of Sage should be formed as the old ones decline.

In continuing them where the ground is much impoverished, a little dry rotten dung should be pointed in lightly, to give more vigour to the plants.

Culture in the Clary Kind.—These in the herbaceous kinds are easily raised from seed, and in the perennial sorts by parting the roots.

The seed should be sown in March, in any bed or border of common earth, raking it in; and when the plants have got leaves of two or three inches growth, they should be planted out in showery weather, in rows eighteen inches distant, and at the same distance in the lines: they soon strike root, and grow large, furnishing large leaves, fit for use in autumn, winter, and the following spring.

The perennial sorts are raised from seed in the same manner, setting the young plants out in the summer in nursery-rows till autumn, when they should be planted out into the borders, &c.

The annual sorts may be sown in spring in the borders, in patches to remain.

The roots in the perennial kinds may be parted in autumn, or early in the spring, and planted out where they are to remain.

Culture in the tender Shrubby Kinds.—These are easily increased by cuttings of the young shoots; they should be planted in pots in the spring, and plunged in a hot-bed, where they soon emit roots at bottom and shoots at top, and should be gradually hardened to the full air: but cuttings planted in summer will often strike without the aid of a hot-bed when planted either in pots or in a bed of natural earth, under frames and lights, or covered close with hand-glasses, and shaded from the mid-day sun, being occasionally watered.

The young plants should afterwards be potted off separately, and managed as other shrubby exotics of the green-house.

The last sort requires a warm dry green-house in winter, and to be very sparingly watered. See GREEN-HOUSE PLANTS.

Some of the sorts are useful as culinary plants, others for the purpose of ornament in the borders, &c. and the tender sorts in green-house collections.

SAMBAC. See JASMINUM.

SAMBUCUS, a genus containing hardy deciduous trees, shrub and herbaceous perennials.

It belongs to the class and order *Pentandria Trigynia*, and ranks in the natural order of *Dumosæ*.

The characters are: that the calyx is a one-leafed perianth, superior, five-parted, very small, permanent: the corolla one-petalled, rotate-concave, five-cleft, blunt: segments reflex: the stamina have five awl-shaped filaments, the length of the corolla: anthers roundish: the pistillum is an inferior, ovate, blunt germ: style none; but instead of it a ventricose gland: stigmas three, blunt: the pericarpium is a roundish one-celled berry: the seeds three, convex on one side, angular on the other.

The species cultivated are: 1. *S. nigra*, Common Elder; 2. *S. racemosa*, Red-berried Elder; 3. *S. Ebulus*, Dwarf Elder; 4. *S. Canadensis*, Canadian Elder.

The first species grows to a bushy tree twelve or sixteen feet in height, much branched, and covered with a smooth gray bark when young, which becomes rough on the trunk and older branches: the wood is hard, tough, yellow, polishing almost as well as the box-tree; the younger branches containing a very large proportion of medullary matter or pith: the leaves opposite, unequally pinnate: leaflets commonly five, smooth, nearly equal at the base, with very small or no stipules: the cymes terminating, dividing into five principal branches, and many small ones: the flowers cream-coloured, with a sweet but faint smell, especially when dried. It is a native of Britain and many other parts of Europe; also of Africa, Japan, &c., flowering in May and June.

There are varieties with white or green berries, with variegated leaves; and the Parsley-leaved Elder, which has the leaflets narrower, and cut into several segments, which are again deeply indented on their edges regularly, in form of winged leaves: the stalks are much smaller, and the shoots are short; the leaves have not so strong an odour, and the berries are a little smaller.

There are also the Gold-striped-leaved, the Silver-striped-leaved, and the Silver-dusted Elder.

The second species sends up many shrubby stalks from the root, rising ten or twelve feet high, and dividing into many branches, which are covered with a brown bark: the leaves are opposite; the lower generally composed of two pairs of leaflets, terminated by an odd one, shorter and broader than those of the first, and deeply serrate; the upper have frequently but three leaflets; they are of a pale green colour and pretty smooth: the flowers are of an herbaceous white colour, appearing in April, and sometimes succeeded by berries, which are red when ripe. It is a native of Germany, Switzerland, Italy, &c.

The third has a creeping root: the stems herbaceous, three feet high, upright, roundish, grooved, leafy, somewhat enlarged at the joints, purplish, branched above; the branches opposite and upright: the leaves opposite, unequally pinnate, dark green, smoothish: leaflets four to six pairs, ovate-lanceolate, veined, acute, serrate, unequal, and generally glandular at the base, smooth above, downy with a slight roughness underneath, and whiter; the lowermost often lobed: the stipules large, leafy, serrate, sometimes accompanying a pair of leaflets as well as the whole leaf: the cyme terminating in three principal branches, and those dividing into many others, hairy and many-flowered: all the flowers pedicelled. It is a native of many parts of Europe.

It was formerly called Wallwort or Walewort, and Danewort, and differs from the first sort in being herbaceous, in having a creeping root, and narrower leaflets, more numerous, and sometimes lobed.

There is a variety with cut leaves in which the roots do not creep so much, nor the stems rise

so high: the leaves have seldom more than seven leaflets, and towards the top only five, longer and narrower than in the above, deeply cut on their edges, and ending with winged acute points.

The fourth species rises to the height of twenty feet in its native situation, but here, it is seldom much more than half that height: the leaves have generally seven or nine leaflets, which are longer and narrower than those of the first sort: the berries are smaller, of the same black colour, but not so full of juice; nor have the leaves so strong a scent: it is shrubby, but commonly perishes above ground in winter: the cymes are of the same structure as in the first; and the stipules are filiform and truncate, as in that, not expanded into leaflets, as in the third: the berries are reddish, and said to be eatable. It is a native of North America, flowering from June to August.

Culture.—The first and second sorts may be readily increased from cuttings, or by sowing their seeds; but the former being the most expeditious method, it is generally practised. The season for planting the cuttings is any time from the autumn to the spring; in doing of which, there is no more care necessary than to thrust them about six or eight inches into the ground, as they take root readily, and may afterwards be planted out where they are to remain, which may be upon almost any soil or situation, as they are extremely hardy: if their seeds be permitted to fall upon the ground, they often produce plenty of plants the succeeding summer.

They are often planted for fences, on account of their quick growth; but as their bottoms become naked in a few years, they are not by any means proper for that purpose. In this intention the cuttings should be planted in one or two rows, where they are to remain.

This sort of plants should not be planted near habitations, as at the season when they are in flower they are said to emit such a strong scent as to occasion violent pains in the heads of those who abide long near them.

The first sort succeeds in any soil or situation.

The third is increased rapidly, wherever it is once planted, by its creeping roots; and the fourth puts out roots from cuttings almost as easily as the common sort; but being liable to injury from severe frosts, it should be planted in a sheltered situation, and rather dry soil.

All the sorts afford diversity in large ornamental plantations, the common sorts being only thinly introduced.

The fruit of the common sort is frequently made use of for the purpose of making wine from it.

SAND, an earthy substance that is frequently made use of in the culture of different sorts of flowers and plants which require a dry soil.

SAND-BOX TREE. See HURA.

SANGUINARIA, a genus containing a plant of the low herbaceous flowering kind.

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Rhoeadeæ*.

The characters are: that the calyx is a two-leaved perianth, ovate, concave, shorter than the corolla, caducous: the corolla has eight petals, oblong, blunt, spreading very much, alternately interior and narrower: the stamina have very many filaments, simple, shorter than the corolla: anthers simple: the pistillum is an oblong compressed germ: style none: stigma thickish, two-grooved with a streak, height of the stamens, permanent: the pericarpium is an oblong capsule, ventricose, sharp at both ends, two-valved: the seeds very many, round, acuminate.

The species is *S. Canadensis*, Canadian Sanguinaria, Bloodwort, or Puccoon.

It has a tuberous, thick, fleshy root, placed transversely, with several slender fibres descending from it, of a reddish saffron colour, and yielding a juice of the same hue, which is bitter and acrid, and flows also from the leaves and footstalks when cut. In the spring the root puts forth slender round smooth stems, palish green or brownish tinged with purple, each terminated by a little conical head, which expands into a white flower of eight petals, at first concave, then flat, and finally rolled back so as to be convex, marked with slender streaks: filaments white, with saffron-coloured anthers. When the flowers are about expanding, a single leaf comes out upon each flower-stalk, at first small, compressed, and protecting the flower with its foot-stalk; but afterwards becoming larger, and unfolding into lobes, like those of the fig, which are thickish, smooth, internally of a deep glaucous green, externally of a whitish glaucous colour with frequent veins, most conspicuous on the outside; on petioles which are flat and slightly grooved on the inside, and convex on the outside. Three or four flower-stems arise from each root, and are surrounded at the base by oblong, membranaceous, tender, striated scales: the root, leaves, and flowers have no smell. It is a native of America, and flowers here in the beginning of April.

There are varieties with single flowers, with semi-double flowers, and full flowers.

Culture.—This plant is readily increased by parting the roots, and planting them out in the

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1 *Sanguinaria Canadensis.* Canada Puccoon.

2 *Saxifraga crassifolia.* Oval leaved Saxifrage

borders or other places where they are to remain, in the autumnal season, when the leaves and stems decay.

They should have a loose soil, with a mixture of bog earth and rotten leaves, and sheltered situation, not too much exposed to the sun: the roots should not be parted oftener than every two years.

They afford variety in the borders, clumps, and other parts among other low-growing bulbous-rooted plants.

SANTOLINA, a genus comprising plants of the low, under shrubby, evergreen, and herbaceous kinds.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common, hemispherical, imbricate: scales ovate-oblong, acute, pressed close: the corolla compound uniform, longer than the calyx: corollets hermaphrodite, equal, numerous; proper one-petalled, funnel-form: border five-cleft, revolute: the stamina have five capillary filaments, very short: anther cylindrical, tubulous: the pistillum is a four-cornered oblong germ: style filiform, length of the stamens: stigmas two, oblong, depressed, truncate: there is no pericarpium: calyx unchanged: the seeds solitary, oblong, four-cornered: down none: the receptacle chaffy, flattish: chaffs concave.

The species are: 1. *S. Chamæcyparissus*, Common Lavender-cotton; 2. *S. rosmarinifolia*, Rosemary-leaved Lavender-cotton; 3. *S. alpina*, Alpine Lavender-cotton; 4. *S. anthemoides*, Chamomile-leaved Lavender-cotton.

The first has a shrubby stalk dividing into many woody branches, with slender hoary leaves, indented four ways, and having a rank strong odour when handled: the branches divide towards the top into several slender stalks, the lower parts of which have a few small leaves of the same shape as the others, but naked above, and terminated by a single flower, composed of sulphur-coloured fistular florets, without any ray. It rises nearly three feet high in a dry soil and sheltered situation. It is a native of the South of Europe; as Spain and Italy.

There are several varieties of the Hoary Lavender-cotton, which branches out like the common sort, but seldom grows so tall: the branches are divided into a great number of stalks, which are short, hoary, and below set very closely with shorter, thicker, and whiter leaves: the flowers are much larger, and the brims of the florets more reflexed, and of a deeper sulphur-colour. It grows naturally in Spain.

The Creeping Lavender-cotton, which is of still lower stature, seldom rising more than fifteen or sixteen inches high: the branches spread horizontally near the ground, and have shorter leaves than either of the former; they are hoary, and finely indented; the stalks are short, and are each terminated by a single flower of a bright yellow colour, and larger than those of the common sort.

And the dark-green Lavender-cotton, which rises higher than these: the branches are more loosely disposed, and more diffused; are more slender, smooth, and have very narrow long leaves of a deep green colour, indented only two ways; the stalks are slender, naked towards the top, and terminated by single flowers of a gold colour.

The second species is herbaceous, scarcely suffruticose: the leaves at the edge on both sides crenulate with tubercles in two rows, but on the flowering-stalk linear, toothleted on each side at the top: the peduncles long, terminating, one-flowered. According to some, the stalks are shrubby, about three feet high, sending out long slender branches, with single linear leaves about an inch and half long, pale green and entire: the stems terminated by large, singular, globular flowers of a pale sulphur-colour. It is a native of Spain, flowering from July to September.

There is a variety in which the branches are shorter, thicker, and closer set with leaves; which come out in clusters, are shorter, and blunt: the flower-stalks are sparsedly disposed, and have leaves to their top: the flowers are small and of a yellow colour.

In the third, the flowers are without any female florets: it is herbaceous, and has the leaves cut into very fine segments. It is a native of Tuscany, flowering in June.

The fourth species is a palm in height: the stem villose, leafy: the leaves, like those of chamomile, pubescent: the peduncles terminating, longer than the leaves, when fruiting stiffish: the flowers are of a sulphur colour. It is a native of Spain, Italy, and Siberia.

Culture.—These plants may be raised from slips or cuttings, which should be planted out in a border of good light fresh earth in the spring season, water and shade being afforded till they have stricken root, being afterwards kept clean from weeds till the beginning of autumn, when they should be taken up with care, and planted out where they are designed to remain: when the business of removing them cannot be performed at the above period, it should be delayed till the spring following, as when removed late they are apt to be destroyed in the winter: they succeed best in a poor dry soil.

They have a very ornamental effect in the borders and clumps, when kept properly trimmed in and tastefully intermixed with other similar plants, in the fronts and more conspicuous parts.

SAPINDUS, a genus containing plants of the tree, shrubby, and tender exotic kinds.

It belongs to the class and order *Octandria Trigynia*, and ranks in the natural order of *Trihilatæ*.

The characters are: that the calyx is a four-leaved perianth, spreading; leaflets subovate, almost equal, flat, spreading, coloured, deciduous; two of them exterior: the corolla has four ovate, clawed petals; two of them more approximating: nectary of four oblong concave erect leaflets, inserted into the base of the petals: glands four, roundish, inserted also into the base of the petals: the stamina have eight filaments, length of the flower; anthers cordate, erect: the pistillum is a triangular germ: styles three, short: stigmas simple, obtuse: the pericarpium has three capsules, fleshy, globular, connate, inflated: the seed is a globular nut (two-celled).

The species are: 1. *S. Saponaria*, Common Soap-berry Tree; 2. *S. rigidus*, Ash-leaved Soap-berry Tree.

There are other species that may be cultivated for variety.

The first rises with a woody stalk in its native situation, from twenty to thirty feet high, sending out many branches towards the top, which are garnished with winged leaves, composed of three, four, or five pair of spear-shaped leaflets, which are from three to four inches long, and an inch and a quarter broad in the middle, drawing to a point at both ends: the midrib has a membranaceous or leafy border running on each side from one pair of leaflets to the other, which is broadest in the middle between the leaflets; they are of a pale green colour, and are pretty stiff; the flowers are produced in loose spikes at the end of the branches; are small and white, making no great appearance: these are succeeded by oval berries as large as middling cherries, sometimes single, at others two, three, or four are joined together; these have a saponaceous skin or cover, which incloses a very smooth roundish nut of the same form and of a shining black when ripe. It is a native of the West Indies.

The nuts were formerly brought hither for buttons to waistcoats, some tipped with silver, and others with different metals, and were very durable, as they did not wear, and seldom broke.

The second species, according to Miller, has a strong woody stalk which rises about twenty feet high, sending out many short strong branches, covered with a smooth gray bark: the leaves composed of two pairs of spear-shaped leaflets, very stiff and smooth; the inner pair small, seldom more than an inch and half long; the two outer near three inches long, and almost an inch broad in the middle, drawing to points at both ends; they are oblique to the footstalk, of a pale green, and sit close to the midrib: the ends of the branches are divided into two or three footstalks, each sustaining a loose spike of flowers: the berries roundish; generally two, three, or four joined together. It is a native of the West Indies.

Culture.—These plants may be raised from seeds, procured from their native situations, which should be sown in small pots filled with rich fresh earth early in the spring, plunging them in a hot-bed of bark, and watering them frequently:—when the plants appear, the glasses should be raised daily to admit fresh air, and when they have had some growth, they should be shaken out of the pots, carefully separated, and planted in distinct pots filled with light rich mould, re-plunging them in the hot-bed, and shading them from the sun till they have stricken root, when they should have free air admitted daily when the weather is warm, and be frequently watered: as they soon fill the pots with their roots, they should be often removed into larger ones, and be gradually inured to the open air, as when too much forced in the summer they are apt to die in the winter. In the beginning of the autumn they should be removed into the bark-bed of the stove, or be placed upon the shelves of it, where they often succeed better, being managed as other stove plants of the same nature.

They afford variety in stove collections.

SAPONARIA, a genus containing plants of the herbaceous perennial and annual kinds.

It belongs to the class and order *Decandria Digynia*, and ranks in the natural order of *Caryophillei*.

The characters are: that the calyx is a one-leafed, naked, tubular, five-toothed permanent perianth: the corolla has five petals; claws narrow, angular, length of the calyx; border flat, with the plates wider outwards, blunt: the stamina have ten awl-shaped filaments, length of the tube of the corolla, alternately inserted into the claws of the petals, five later; anthers oblong, blunt, incumbent: the pistillum is a subcylindrical germ: styles two, straight, parallel, length of the stamens; stigmas acute: the peri-

carpium is a capsule, length of the calyx, covered, one-celled, oblong: the seeds numerous, small: the receptacle free.

The species cultivated is *S. officinalis*, Common Soapwort.

It has a perennial root, striking deep and spreading wide, and creeping by runners: the stems a foot and half in height, upright, round, rigid, jointed, smooth, often reddish, panicled at top: the leaves opposite, connate, quite entire, three-nerved, smooth: the panicle hemispherical, many-flowered, bracteolate: the corolla flesh-coloured or rose-coloured, varying to white, smelling sweet: the petals entire, crowned at the throat: the seeds blackish, with a granulated surface. It is a native of the Southern parts of Europe, flowering from July to September.

There are two varieties: as with double flowers, which is preserved in gardens, but has the same fault with the single one, of spreading very much at the root.

The hollow-leaved, in which the roots do not spread like those of the common sort: the stalks are shorter, thicker, and do not grow so erect; they rise a foot or more in height; the joints are very near and swelling: the leaves are produced singly on the lower part of the stalks, but towards the top they are often placed by pairs; they are about three inches long and two broad, having several longitudinal veins or plaits, and are hollowed like a ladle: the flowers are disposed loosely on the top of the stalk, have large cylindrical calyxes, only one petal, and scarcely any visible stamens; they are of a purple colour, and appear in July.

Culture.—These plants are readily increased by parting the roots, and planting them out either in the autumn or early spring: the hollow-leaved variety may likewise be raised from slips or cuttings planted at the same seasons. It should have a dry situation, where the air is good.

The double sort affords variety in the borders and other parts, and the hollow-leaved variety is useful for ornamenting rock work.

SARRACENIA, a genus containing plants of the herbaceous perennial kind.

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is a double perianth; lower three-leaved: leaflets ovate, very small, deciduous; upper five-leaved; leaflets subovate, very large, coloured, deciduous: the corolla has five ovate petals, bent in, covering the stamens: claws ovate-oblong, straight: the stamina have numerous small filaments: anthers simple: the pistillum is a roundish germ: style cylindrical, very short: stigma clypeate, peltate, five-cornered, covering the stamens, permanent: the pericarpium is a roundish five-celled capsule: the seeds numerous, roundish, acuminate, small.

The species are: 1. *S. flava*, Yellow Side-saddle Flower; 2. *S. purpurea*, Purple Side-saddle Flower.

The first has the leaves near three feet high, small at the bottom, but widening gradually to the top; they are hollow, and arched over at the mouth like a friar's cowl: the flowers grow on naked pedicels, rising from the root to the height of three feet, and are of a green colour. It is a native of Carolina, Virginia, &c. flowering in June and July.

The second species has a strong fibrous root, which strikes deep into the soft earth, from which arise five, six, or seven leaves, in proportion to the strength of the plant; these are about five or six inches long, hollow like a pitcher, narrow at their base, but swell out large at the top; their outer sides are rounded, but on their inner side they are a little compressed, and have a broad leafy border running longitudinally the whole length of the tube; and to the rounded part of the leaf there is on the top a large appendage or ear standing erect, of a brownish colour; this surrounds the outside of the leaves about two thirds of the top, it is eared at both ends, and waved round the border: from the centre of the root, between the leaves, arises a strong, round, naked footstalk, about a foot high, sustaining one nodding flower at the top: the leaflets of the upper calyx are obtuse, and bent over the corolla, so as to cover the inside of it; they are of a purple colour on the outside, but green within, only having purple edges: the petals are of a purple colour, and hollowed like a spoon. It is a native of most parts of North America, in boggy situations.

Culture.—As these plants grow naturally in soft boggy situations, they are raised with difficulty here. The best mode is to procure them from the places of their natural growth, and to have them taken up with large balls of earth to their roots, and planted in tubs of earth; they should be constantly watered during their passage, otherwise they decay before they arrive: as there is little probability of raising these plants from seeds, so as to produce flowers in many years, if the seeds should even grow, young plants should be taken up for this purpose, as they are more likely to stand than those which have flowered two or three times. When the plants are brought over, they should be planted into pretty large pots, which should be filled with soft spongy earth, mixed with rotten wood, moss, and turf, which is very like the natural

soil in which they grow. These pots should be put into tubs or large pans which will hold water, with which they must be constantly supplied, and placed in a shady situation in summer; but in winter be covered with moss, or sheltered under a frame, otherwise they will not live in this climate; having free air admitted in mild open weather.

SASSAFRAS. See LAURUS.

SATTIN, WHITE. See LUNARIA.

SATUREIA, a genus containing plants of the low under-shrubby and herbaceous perennial and annual kinds.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leafed perianth, tubular, striated, erect, permanent: mouth five-toothed, almost equal, erect: the corolla one-petalled, ringent: tube cylindrical, shorter than the calyx: throat simple: upper lip erect, blunt, acutely emarginate, length of the lower lip: lower lip three-parted, spreading; segments blunt, equal, the middle one a little larger: the stamina have four filaments, setaceous, distant, scarcely the length of the upper lip; the two lower a little shorter: anthers converging: the pistillum is a four-cleft germ: style setaceous, length of the corolla: stigmas two, setaceous: there is no pericarpium: calyx converging, containing the seeds in the bottom: the seeds four, roundish.

The species cultivated are: 1. *S. montana*, Winter Savory; 2. *S. hortensis*, Summer Savory; 3. *S. juliana*, Linear-leaved Savory; 4. *S. Thymbra*, Whorled Savory; 5. *S. capitata*, Ciliated Savory.

The first is a perennial plant, with a shrubby low branching stalk: the branches rise about a foot high, are woody, and have two very narrow stiff leaves, about an inch long, opposite at each joint: from the base of these come out a few small leaves in clusters: the flowers axillary upon short footstalks, shaped like those of the second sort, but larger and paler. They appear in June, and the seeds ripen in autumn. It is a native of the South of France and Italy.

The second species is an annual plant, with slender erect stalks about a foot high, sending out branches at each joint by pairs: the leaves opposite, about an inch long, and one eighth of an inch broad in the middle, stiff, a little hairy, and having an aromatic odour if rubbed: the flowers towards the upper part of the branches axillary; each peduncle sustaining two flowers: the corolla pale flesh-colour. It is a native of the South of France and Italy, flowering from June to August.

The third has very slender woody stalks, which grow erect, about nine inches high, sending out two or three slender side branches towards the bottom: the leaves opposite, stiff: the flowers in whorls for more than half the length of the stalk, seeming as if they were bundled together: the corolla small and white: the whole plant has a pleasant aromatic smell. It is a native of Italy, flowering from May to September.

The fourth species rises about two feet high with a woody stem, and divides into many branches, so as to form a small bush: the leaves somewhat like those of Common Savory, having a strong aromatic scent when bruised.

In this the whorls are four or five, whereas in the preceding there are nineteen or twenty. It is a native of the island of Candia.

The fifth has a low shrubby stalk, which sends branches on every side, about six inches long, and hoary: the leaves stiff, narrow, acute-pointed: the flowers in short roundish spikes at the end of the branches, small and white: the whole plant is hoary and very aromatic. It never produces seeds in this climate. It is a native of the Levant, flowering from June to October.

Culture.—The first sort may be raised from seeds, or by planting slips.

The seeds should be sown in the early spring, as the end of March or beginning of April, on a bed of light rich earth, raking it in lightly; when the plants appear they should be occasionally watered, and kept properly thinned.

Some of these plants, when a few inches high, are often taken up, and planted out in nursery rows six inches apart in moist weather, to remain to the autumn or spring, and then planted out with balls of earth about their roots, in rows a foot asunder, to remain.

But the better method is by planting slips or cuttings at the above period, which readily take root, and form good plants, which in the autumn may be planted out with balls to their roots, in beds or rows a foot apart,

The second sort is raised from seeds, which should be sown thinly in the beginning of April upon a bed of light earth, where the plants are to remain.

Some, however, transplant them in the same manner as the above.

The plants should afterwards be kept clean from weeds, and managed in the same manner as has been directed for Marjoram.

The other tender sorts may be increased by slips or cuttings of the most strong side-shoots, planting them out in pots, (or in a shady border protected by mats) the pots being plunged in a moderate hot-bed: they soon begin to grow, and should have free air and water: when well

rooted in the autumn, they should be removed into separate small pots, filled with fresh undunged mould, and placed in the shade till well rooted, and afterwards in a sheltered situation till the autumn, when they should be taken under a garden frame, having free air when the season is fine, but be well protected from frost.

As these plants seldom continue more than a few years, some should be frequently raised as a supply against they decline.

The two first sorts are useful pot-herbs, and the other kinds afford variety among collections of green-house plants.

SATYRIUM, a genus containing plants of the bulbous-rooted, hardy-flowering perennial kind.

It belongs to the class and order *Gynandria Diandria*, and ranks in the natural order of *Orchideæ*.

The characters are: that the calyx is, as the spathes, wandering: spadix simple: the perianth none: the corolla has five ovate-oblong petals: three exterior; two interior converging upwards into a helmet: nectary one-leafed, annexed to the receptacle by its lower side between the division of the petals; upper lip erect, very short; lower flat, pendulous, prominent behind at the base in a scrotiform bag: the stamina have two filaments, very slender and very short, placed on the pistil: anthers obovate, covered by the two-celled fold of the upper lip of the nectary: the pistillum is an oblong germ, twisted, inferior: style fastened to the upper lip of the nectary, very short: stigma compressed, obtuse: the pericarpium is an oblong capsule, one-celled, three-keeled, three-valved, opening in three parts under the keels, cohering at the top and bottom: the seeds numerous, very small, irregular like saw-dust.

The species are: 1. *S. hircinum*, Lizard Satyrion, or Lizard-flower; 2. *S. viride*, Frog Satyrion; 3. *S. albidum*, White Satyrion.

The first frequently attains the height of three feet, and produces from twenty to sixty or more flowers, remarkable for their fetid goat-like smell: the upper part of the lip is downy, and marked with elegant purple spots on a white ground; otherwise the flowers are more singular than beautiful: the leaves are near five inches long and half an inch broad; the spike of flowers is six inches in length: the corolla of a dirty white, with some linear stripes and spots of a brown colour; the middle segment of the lip of the nectary is two inches long. It is a native of Germany, &c.

It is often called Goat Orchis: "It has been occasionally met with in the neighbourhood about Dartford; but the greediness of the collectors has frequently endangered its total destruction, and in some seasons none can be found in flower."

"The circumstance of its varying in size and the breadth of the leaves, has given occasion to old authors to make two species of it: the flowers are sometimes quite white."

2. "It was found at the Cape of Good Hope, on the top of the Table mountain; whence its trivial name."

3. "It is large and panicled: found at the Cape."

4. "This is a fathom in height, with large orange coloured flowers."

5. "In this the lip is muricate with white and purple prickles. Both these were also found at the Cape."

The second species has a stem from five to eleven inches high, and solid, with unequal sharp angles, formed from the edges of the leaves and bractes: the spike lanceolate, from one to three inches long, loose with few flowers: the bractes subulate-lanceolate, keeled, somewhat bowed-in. It is a native of many parts of Europe, flowering from May to August.

The third has the stem from nine to fifteen inches high: the lower leaves oval, sheathing the stem; upper lanceolate, acute: the flowers very numerous, in a long (an inch and half, cylindrical,) close spike: the bractes lanceolate, very acute, longer than the germ: the petals white, oval-lanceolate, all converging: lip of the nectary short, green, divided into three acute segments, the middle one longest and more blunt, the spur blunt, about half as long as the germ. It is a native of Scania, Denmark, &c. flowering in June and July.

Culture.—These plants are not raised without some difficulty: the best mode of increasing them is by taking up the roots with a good ball about them from their natural situations, and planting them in a soil as similar as possible, where they are to grow, letting the ground around them afterwards remain wholly undisturbed.

They sometimes also succeed by seed and offsets from the roots planted out after the stems decay.

They afford variety in borders among other similar plants.

SAVIN. See JUNIPERUS.

SAVORY. See SATUREIA.

SAVOY CABBAGE. See BRASSICA.

SAXIFRAGA, a genus containing plants of the low hardy herbaceous perennial kind.

It belongs to the class and order *Decandria Digynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is a one-

leafed perianth, five-parted, short, acute, permanent: the corolla has five petals, spreading, narrow at the base: the stamina have ten awl-shaped filaments: anthers roundish: the pistillum is a roundish acuminate germ, ending in two short styles: stigmas blunt: the pericarpium is a subovate two-beaked capsule, two-celled, opening between the points: the seeds numerous, minute.

The species mostly cultivated are: 1. *S. Cotyledon*, Pyramidal Saxifrage; 2. *S. granulata*, White Saxifrage; 3. *S. crassifolia*, Thick-leaved Saxifrage; 4. *S. umbrosa*, London Pride; 5. *S. hypnoides*, Mossy Saxifrage, or Ladies' Cushion; 6. *S. sarmentosa*, China Saxifrage; 7. *S. rotundifolia*, Round-leaved Saxifrage.

There are other species that may be cultivated.

The first has the panicle very much branched, many-flowered, or branched a little with few flowers: the petals unspotted or spotted; and according to Miller, who has made three species of it, the roots are perennial and fibrous, and the leaves are gathered into circular heads, embracing each other at the base like the common Houseleek, in some of the sorts tongue-shaped, about two inches long, and a quarter of an inch broad: the stem about a foot high, purplish, a little hairy, and sending out several horizontal branches the whole length: the flowers are in small clusters at the end of the branches; white with several red spots on the inside. But in others the leaves are smaller. It is a native of the Alps.

It is observed, that when these plants are strong they produce very large pyramids of flowers, which make a fine appearance; and being kept in the shade, and screened from wind and rain, continue in beauty a considerable time: they flower in June. There are several varieties.

The second species has the root composed of several little grains or knobs, attached to one main fibre, and throwing out small fibres from their base: the stem is erect, round, pubescent, leafy, somewhat viscid, branched and panicled at top, of a brown or reddish hue, with which colour the leaves, &c. are also tinged, giving the whole herb a rich glowing appearance; these parts are also clothed with the same kind of hairs, especially the calyx, which is very clammy to the touch: the leaves are somewhat fleshy, lobed, and cut; those next the root on long foot-stalks; those on the stem alternate, subsessile. It is a native of Europe, flowering in May.

It varies with double flowers, in which state it is cultivated as an ornamental plant.

The third has the root superficial, black, scaly, with the relics of dead leaves, the thickness of a finger or thumb, round, sending down filiform fibres from the lower surface: the stems from the axils of the leaves of the year preceding at the tops of the roots alternate, very short, almost upright, covered with the sheaths of the leaves, quite simple, but branched in autumn: the leaves three or four, alternate, spreading very much, obovate-oblong, crenulate, subretuse, very smooth, veined, a span long, flat, coriaceous: the petioles shorter by half than the leaves, roundish, channelled, smooth, with a wide membrane at the base, of an ovate form, embracing, and in the winter season serving for a gem: the scape or peduncle terminating, solitary, erect, a span high, the thickness of the little finger, roundish, very smooth, purplish, almost naked, many-flowered: the panicle contracted, naked, blood-red, composed of pedate racemes: the flowers inferior, drooping, pedicelled: the pedicels short, round, rugged.

It is observed, that "the stem changes every year into root; that which flowers one year losing its leaves during the winter, turning to the ground, becoming black, and putting forth fibres:" and after the plant has flowered, the stem puts forth branches from the axils of the leaves, which have the panicle of flowers for the next year included in their gems.

According to Curtis, the leaves are large, red on the under, and of a fine shining green on their upper surface, and may be ranked among the more handsome kinds of foliage: the flowering stems, according to the richness and moisture of the soil in which they are planted, rise from one to two or even three feet high; at top supporting a large bunch of purple pendulous flowers, expanding in April and May, and, if the season prove favourable, making a fine appearance. It is a native of Siberia.

It is remarked, that "there is another Saxifrage in gardens, exceedingly like this in appearance, but differing, in producing larger bunches of flowers, and in having larger, rounder, and more heart-shaped leaves."

The fourth species has the leaves all radical, aggregate in tufts, spreading, running down into the petiole, even and quite smooth, often purple beneath: the scape a span high, erect, red, hairy, many-flowered, with a few small alternate bractes: the flowers upright: the calyx finally reflexed: the petals obovate-lanceolate, white or flesh-coloured, most beautifully dotted with yellow and dark red: the germ altogether superior, rose-coloured: the capsule ventricose, tipped with purple. It is a native of Ireland and England, flowering in June and July. It has the names of None-so-pretty, and London Pride.

The fifth has long slender fibrous roots, throwing out many procumbent leafy shoots, which grow matted together, forming thick tufts: from the common origin of these arises a solitary erect round stem, bearing two or three straggling linear undivided leaves, and terminating in an upright panicle of a few large white flowers: the leaves are alternate, linear, acute, pale green, smooth, their edges only often hairy with soft white woolly threads: the leaves on the shoots simple and undivided; those at the bottom of the stem all deeply three-cleft, with the segments divaricate. According to Withering, the stem, fruitstalks, and calyx are thickly set with short hairs terminated by red globules, and the rest of the plant thinly set with fine white hairs. It is a native of Britain, flowering in May, and often again sparingly in July and August.

The sixth species has the root-leaves petioled, cordate-suborbicular, hairy, crenate, with blunt lobules, oleraceous, having white veins on the upper surface, beneath liver-coloured: the petioles roundish, longer than the leaf: the stem herbaceous, round, a foot and half high, almost leafless, pubescent, as the whole herb is, with hairs standing out; the whole raceme compound, the partial racemes drooping at the end before they flower. Branched runners proceed in abundance from the axils of the root-leaves, terminating in rooting off-sets: three of the petals are smaller, whitish stained with red; two larger, white. It is observed, that "its round variegated leaves, and strawberry-like runners, with the uncommon magnitude of the two lower pendent petals, joined to the very conspicuous glandular nectary, in the centre of the flower, half surrounding the germ, render it strikingly distinct." It is a native of China and Japan, flowering in June and July.

The seventh has the lower leaves almost round, on long footstalks, deeply divided, hairy and green above, pale beneath: the stems erect, about a foot high, channelled and hairy, with kidney-shaped leaves: the stem puts out a few slender footstalks from the upper part, which, together with the stem itself, are terminated by small clusters of flowers, white spotted with red. It is a beautiful plant, and a native of Switzerland, &c.

Culture.—The first sort may be readily increased by planting off-sets taken from the sides of the old plants in small pots filled with fresh light earth, placing them in the shade during the summer, but letting them be exposed to the influence of the sun in winter: all the off-sets should be taken off, as by that means they will flower much stronger: the young plants afford flowers the second year.

The second sort may likewise be increased in the same way, which should be planted out where they are to remain in July, when the stems decay, in fresh undunged earth, giving them a shady situation till winter: they should be set out in large tufts, and when in the open ground have a shady place assigned them.

The third sort may be increased with little trouble by parting the roots, and planting them out in the spring or autumn in the open ground, or in pots in the former situation, being protected in severe weather, and in the latter removed to the green-house or a garden frame.

The fourth may also be raised by offsets in the same way, a shady situation being chosen.

The fifth sort is easily increased by planting its trailing rooted branches in the autumn where they are to remain: it should have a moist soil and shaded situation.

The sixth may be readily raised by the runners, which may be planted in pots to be placed in the green-house, though it will bear the open air in mild winters in a warm sheltered situation.

The last may be increased by parting the roots and planting them out in the early autumn: it should have a moist shady situation, with a rather stiff loamy soil.

They all afford ornament and variety in the clumps, borders, and other parts of pleasure-grounds; except the sixth, which must have a place in the green-house collection.

SCABIOSA, a genus containing plants of the herbaceous, annual, biennial, perennial, and shrubby kinds.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Aggregatæ*.

The characters are: that the calyx is a common perianth, many-flowered, spreading, many-leaved: leaflets in various rows surrounding the receptacle and placed upon it, the inner ones gradually less: proper perianth double, both superior; outer shorter, membranaceous, plaited, permanent; inner five-parted, with the segments subulate-capillaceous: the corolla universal equal, often from unequal ones: proper one-petalled, tubular, four- or five-cleft, equal or unequal: the stamina have four filaments, subulate-capillary, weak: anthers oblong, incumbent: the pistillum is an inferior germ, involved in its proper sheath as in a calycle: style filiform, length of the corolla: stigma obtuse, obliquely emarginate: there is no pericarpium: the seeds solitary, ovate-oblong, involute, crowned variously with proper calyxes: the receptacles common convex, chaffy, or naked.

The species mostly cultivated are: 1. *S. al-*

pina, Alpine Scabious; 2. *S. leucantha*, Snowy Scabious; 3. *S. succisa*, Devil's-bit Scabious; 4. *S. integrifolia*, Red-flowered Annual Scabious; 5. *S. tatarica*, Giant Scabious; 6. *S. gramuntia*, Cut-leaved Scabious; 7. *S. stellata*, Starry Scabious; 8. *S. atropurpurea*, Sweet Scabious; 9. *S. argentea*, Silvery Scabious; 10. *S. graminifolia*, Grass-leaved Scabious; 11. *S. Africana*, African Scabious; 12. *S. Cretica*, Cretan Scabious.

The first has a perennial root, composed of many strong fibres which run deep in the ground: the stems several, strong, channelled, upwards of four feet high: the leaflets four or five pairs, unequal in size and irregularly placed, ending in acute points: the flowers are on naked peduncles at the ends of the branches, of a whitish yellow colour, appearing at the end of June. It is a native of the Alps of Switzerland, &c.

The second species has a perennial root: the lower leaves almost entire, serrate: stem stiff, two feet high, bifid at top, spreading; in the division arises a naked peduncle, which, as also the divisions, are each terminated by a single flower, composed of many white florets. It is a native of the South of France, &c.

The third has also a perennial, oblong, blackish root, near the thickness of the little finger, often growing obliquely, stumped at the lower end so as to appear as if bitten off, whence its trivial name, and furnished with long whitish fibres: the stem from a foot to eighteen inches in height, upright, branched at top, round, rough with hair, and often of a reddish colour: the branches are lengthened out, and each bears one flower: the root-leaves are ovate, quite entire, blunter than the others; the stem-leaves lanceolate, the lower ones remotely toothed, but the upper ones entire; all dark-green, rather coriaceous, harsh and hairy: the flowers in nearly globular heads. It is a native of Europe, flowering from August to the end of October.

The fourth species has an annual root: the stem is not hispid: the branches patulous: the root-leaves, like those of the Daisy, ovate, bluntish, rugged, more acutely serrate; stem-leaves few; branch-leaves lanceolate, embracing, ciliate at the base, seldom toothed or pinnatifid, very long. It is a native of Germany, flowering from June to August.

The fifth rises with a strong branching stalk four or five feet high, closely armed with stiff prickly hairs; lower hairs spear-shaped, about seven inches long, and near four broad in the middle, deeply cut on the sides; the stem-leaves more entire, some of them sharply serrate; those at the top linear and entire: the flowers from the sides and at the top of the stalks, white, and each sitting in a bristly calyx: the root is biennial. It is a native of Tartary, &c.

The sixth species has the root-leaves villose, ash-coloured, deeply pinnatifid; with the pinnules blunt, distinct, the lower ones linear and entire, the upper gradually wider, blunt, gash-toothed: the stem-leaves bipinnate, with the leaflets linear, narrow, unequal, scarcely pubescent: the stem a foot and half in height: it flowers very late, even in November, and is perennial. It is a native of the South of France, &c.

The seventh is annual, the stems three feet high, hairy: the leaves oblong, deeply notched; the upper ones cut almost to the midrib into fine segments: the flowers on long peduncles: the receptacles are globular: the florets large, spreading open like a star, of a pale purple colour. It is a native of Spain and Barbary, flowering in July and August.

It varies with different jagged leaves, and with red and white flowers.

The eighth species has a fibrous annual biennial root, crowned with a large tuft of oblong leaves, variously jagged and cut on the edges: the stems upright, numerously branched on every side, three feet high or more: the calyx is twelve-leaved, recurved, linear, the length of the corolla: the flower very dark purple, with white anthers: the fruit ovate: the receptacle subulate, with bristle-shaped chaffs. It flowers from June to October: the flowers are very sweet, and there is a great variety in their colour, some being of a purple approaching to black, others of a pale purple, some red and others variegated. It also varies in the leaves, some being finer cut than others: and sometimes from the side of the calyx come out many slender peduncles sustaining small flowers, like the (proliferous or) Hen-and-chicken Daisy.

The ninth is a low perennial plant, with a branching stalk spreading wide on every side; the leaves are of a silvery colour; the flowers are small, pale, and have no scent: the stem has white hairs thinly scattered over it: the root-leaves are somewhat toothed: stem-leaves undivided, and ciliate towards the base. It is a native of the Levant, flowering from June to October.

The tenth species has a perennial root, from which arise three or four stalks, the lower parts of which have linear leaves about four inches long, and the eighth of an inch broad, of a silvery colour, ending in acute points: the upper part of the stalk is naked for six or seven inches in length, and sustains at the top one pale-blue

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Scabiosa atropurpurea
Sweet Scabious

Scilla campanulata
Bell-flowered Squill

flower. It is a native of the mountains of Dauphiné, flowering in July.

The eleventh has a weak shrubby stalk, which divides into several branches, and rises about five feet high: the leaves are ovate-lanceolate, three inches long, and an inch and half broad, deeply crenate, of a light green, and a little hairy: the peduncle terminating, sustaining one pale flesh-coloured flower. It is a native of Africa, flowering from July to October: it varies in the leaves. The variety with the leaves finely cut, has, according to Miller, the stalks hairy, and dividing into several branches: the bottom leaves are lanceolate crenate and entire; but those on the upper part of the stalk are bipinnate: the flowers are produced on long naked footstalks from the end of the branches; are of a pale flesh-colour and large, but have no scent.

The twelfth rises with a shrubby stalk three feet high, and divides into several woody knotty branches: the leaves are narrow, silvery, entire, four inches long, and a quarter of an inch broad: the flowers stand upon very long naked peduncles at the end of the branches, and are of a fine blue colour. It is a native of Candia and Sicily. According to Miller, the plant from Candia has shorter and much broader leaves, and not so white as those of the Sicilian; the flowers are not so large, and are of a pale purple colour.

Culture.—All the annual and biennial sorts may be increased by seed, which should be sown in a bed or border of common mould, or in pots to be forwarded in the hot-bed in the early spring months; but the biennial sort is better sown in the latter end of the summer, as about August, as they flower stronger and more fully the following summer. Some may however be sown at both seasons.

When the plants have attained some growth, in the spring-sown sort, they should be pricked out into the places where they are to grow, on beds, to be afterwards removed: and in the autumn-sown sorts into nursery-rows, six or eight inches apart, to be removed into the places where they are to remain, with balls about their roots, in the following spring, being duly watered and kept free from weeds.

The starry sort is best sown in patches in the borders or clumps where the plants are to flower.

The herbaceous perennial kinds may be readily increased by sowing the seeds in a bed or border of good light earth, in the spring season, the plants being planted out when they have attained a little growth where they are to grow: they are also capable of being raised by parting the roots and planting them out where they are to grow in the autumn.

The shrubby kinds may be readily raised by planting slips or cuttings of the young branches in the spring or summer season, in the former season in pots and plunged in a moderate hot-bed, or under a glass frame; but in the latter, in the open ground, being well shaded and watered. They soon become tolerably well rooted, and in the autumn may be potted off into separate pots filled with light loamy earth, and managed in the same manner as other exotic green-house plants during the winter.

The annual and perennial sorts afford ornament and variety among other plants of the flower kind in the borders, &c., and the shrubby kinds produce variety in green-house collections.

SCALLION. See ALLIUM.

SCANDIX, a genus containing plants of the hardy herbaceous annual and perennial kinds.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ or Umbelliferæ*.

The characters are: that the calyx is an universal umbel, long, with few rays: partial more abundant: involucre universal none: partial five-leaved, length of the umbellet: perianth proper obsolete: the corolla universal difform, radiate: florets of the disk abortive: proper petals five, inflex-emarginate: the inner ones smaller; outmost larger: the stamina have five capillary filaments: anthers roundish: the pistillum is an oblong inferior germ: styles two, awl-shaped, length of the least petal, distant, permanent: stigmas in the radiant florets obtuse: there is no pericarpium: fruit very long awl-shaped, bipartite: the seeds two, awl-shaped, convex and grooved on one side, flat on the other.

The species is *S. cerefolium*, Garden Chervil.

It has an annual root: the leaves are of an exceedingly delicate texture, smooth, shining, tripinnate; with the segments deeply semipinnate, and the lobules lanceolate, shortly two-toothed, or three-toothed: the stem smooth, from a foot to two feet in height, hairy only under the origin of the branches, whence always are produced two branches and a single leaf: the flowers white. It is a native of many parts of Europe, flowering in May. It was formerly much more cultivated than at present. It is used as a culinary plant in winter and spring, and is a native of the Levant.

Culture.—This plant may be raised from seed by sowing at different times in the early spring, as from February to March, and also in August for winter use, in beds of common earth, raking

yellow flower, which is succeeded by a thick twisted pod, the size and appearance of a large green caterpillar. It is a native of the South of Europe.

The second species has stronger stalks than the first; the leaves are much broader; the peduncles support two smaller flowers; the pods are slender, longer and more twisted, and are armed with blunt spines on their outside. It is a native of the South of Europe.

The third has slenderer stalks than either of the former; the leaves stand upon shorter foot-stalks, but are shaped like those of the first sort; the peduncles are slender, and frequently support three flowers; the pods are slender, not so much twisted as the former, and armed on their outside with sharp distinct spines. It is a native of the South of Europe, and Barbary.

Culture.—These plants may be increased by sowing the seeds in the places where they are to remain in the early spring months, three or four seeds being put in, in a place, the plants should be thinned properly and kept clean from weeds afterwards, when they will produce flowers, and pods having the resemblance of caterpillars, about the month of June.

The first sort is the most deserving of cultivation, as being the largest in the pods and most perfectly formed.

They afford ornament and variety in their curious pods.

SCORZONERA, a genus containing a plant of the tap-rooted esculent kind.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Compositæ Semiflosculosæ*.

The characters are: that the calyx is common, imbricate, long, subcylindrical: scales about fifteen, scariose at the edge: the corolla compound, imbricate, reniform: corollets hermaphrodite numerous, the outer a little longer: proper one-petalled, ligulate, linear, truncate, five-toothed: the stamina have five capillary filaments, very short: anther cylindrical, tubular: the pistillum is an oblong germ: style filiform, length of the stamens: stigmas two, reflexed: there is no pericarpium: calyx ovate-oblong, converging and finally spreading and reflexed: the seeds solitary, oblong, cylindrical, striated, shorter by half than the calyx: pappus feathered, sessile, with chaffy and bristly rays mixed: the receptacle naked.

The species cultivated is *S. Hispanica*, Garden Viper's-grass, or Spanish Scorzonera.

It has a carrot-shaped root, about the thickness of a finger, and covered with a dark brown skin; it is white within, and has a milky juice: the lower leaves nine or ten inches long, and an inch and half broad in the middle, ending with a long acute point: the stalk three feet high, smooth, branching at top, and having on it a few narrow embracing leaves: the flowers are bright yellow. It is a native of Spain, the South of France, &c.

It is cultivated for the root, which is boiled and eaten as carrots, or it may be fried in batter, which is probably the better way of using it. They are ready for use in the autumn and winter season.

Culture.—These crops should be raised from seed sown either in the autumn or spring season, about April, in an open spot of ground where the soil is light and fine. The best mode of sowing them is in shallow drills, about a foot apart, in a thin manner, covering them in to the depth of half an inch: the plants, when of some growth, should be thinned out when they are too thick, to the distance of six or eight inches, keeping them clean from weeds by hoeing.

Some also raise them by sowing the seed broad-cast over the surface, and afterwards thinning the plants or transplanting them into other beds; but the first is the most successful method, and transplanting should never be practised with tap-rooted plants.

The roots may be taken up in the autumn, and preserved in the same manner as those of carrots; but they are sometimes left in the ground to be pulled as they are made use of.

In order to save seed, some of the best plants should be left where sown, to run to seed, which, when perfectly ripened, should be collected and preserved in a dry situation till wanted.

SCOTCH FIR. See PINUS.

SCREW-PINE. See PANDANUS.

SCREW-TREE. See HELICTERES.

SCROPHULARIA, a genus comprising plants of the fibrous-rooted, herbaceous, and shrubby kinds.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a one-leafed perianth, five-cleft, permanent: segments shorter than the corolla, rounded: the corolla one-petalled, unequal: tube globular, larger, inflated: border five-parted, very small: segments, the two upper larger, erect; two lateral, spreading a little; one lowest, bent back: the stamina have four linear filaments, declining, length of the corolla; of which two are later: anthers twin: the pistillum is an ovate germ, style simple, situation and length of the stamens: stigma simple: the pericarpium is a roundish capsule, acuminate, two-celled, two-valved: partition folded, constructed of the margins of

the valves bent in; opening at the top: the seeds very many, small: the receptacle roundish, insinuating itself into each cell.

The species cultivated are: 1. *S. frutescens*, Shrubby Figwort; 2. *S. trifoliata*, Three-leaved Figwort; 3. *S. sambucifolia*, Elder-leaved Figwort; 4. *S. lucida*, Shining-leaved Figwort.

The first has the stem perennial, (or becoming woody,) four-cornered, acute-angled, brachiate below: the leaves ovate, toothed, shining, smooth, small, opposite: the lower obovate; the upper oblong: the raceme terminating, leafy, with quite entire bractes, and opposite trifid peduncles, the length of the bractes: corollas small, very dark purple, with the lateral segments white, and the lowest very small. A native of Portugal.

The second species has the stem simple or sparingly branched, erect, smooth, four-cornered, striated: the leaves cordate, smooth and even, shining, veined, obtuse, unequally and obtusely double-toothed, petioled; the lower ones often eared at the base: the raceme interrupted: the peduncles alternate: the flowers pedicelled, in racemelets. According to Plukenet, they are beautifully variegated with red and yellow. It is a native of Corsica and Africa, and is biennial or perennial.

In the third the stem is erect, four-cornered from the decurrent petioles: the leaves pinnate, with five or seven leaflets, (besides the smaller ones placed between them) cordate, wrinkled, smooth above, serrate, with the end one larger: the raceme terminating, composed of very short, subdichotomous, axillary peduncles in pairs: flowers large, purple with the lower lip greenish. It is a native of Portugal, flowering from July to September, and perennial.

The fourth species, according to Miller, is a biennial plant, with stalks fifteen inches high, thick, smooth, and having scarcely any corners: leaves pinnate, narrow, of a lucid green, thick, succulent, and divided into many leaflets, which are again divided (bipinnate): flowers in loose bunches on the sides and at the top of the stalk, of a dark brown colour with a mixture of green. It is a native of the kingdom of Naples.

Culture.—These plants may be increased by seeds, which should be sown in autumn in the borders or other places where the plants are to remain. The plants should be kept free from weeds; when the roots continue several years, unless destroyed by severe frosts. It is therefore a good practice to have some in pots protected by a frame and glasses: and as the young plants flower the strongest, a proper succession should be sown annually. They may also be sometimes raised from the parted roots; and the shrubby sorts by cuttings in the summer.

They afford ornament in the clumps, &c.

SCULL-CAP. See SCUTELLARIA.

SCUTELLARIA, a genus containing plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leafed perianth, very short, tubular: mouth almost entire; after flowering closed with a lid: the corolla one-petalled, ringent: tube very short, bent backwards: throat long, compressed: upper lip concave, trifid; middle little segment concave, emarginate; side ones flat, sharpish, lying under the middle one; lower lip wider, emarginate: the stamina have four filaments, concealed beneath the upper lip, of which two are longer: anthers small: the pistillum is a four-parted germ: style filiform, situation and length of the stamens: stigma simple, curved in, acuminate: there is no pericarpium: calyx closed by a lid, helmet-shaped, doing the office of a capsule, three-sided, opening by the lower margin: the seeds four, roundish.

The species are: 1. *S. integrifolia*, Entire-leaved Skull-cap; 2. *S. peregrina*, Florentine Skull-cap; 3. *S. altissima*, Tall Skull-cap.

The first has the stems two feet high, sending out many side branches: the lower leaves heart-shaped and serrate, standing upon pretty long foot-stalks; upper leaves ovate and entire: the flowers in very long loose spikes at the end of the branches; they are of a purple colour, and appear at the end of June. It is a native of North America.

The second species has the stem hairy, two feet high: the flowers are purple or white. It is a native of Italy, &c.

The third has the stems three or four feet high, sending out a few slender branches: the flowers are purple, with longer tubes than those of any of the other sorts. It is a native of the Levant.

Culture.—These are all raised from seed, which should be sown in the autumn or spring, but the former is the better season, in the places where they are to remain, or in a border to be removed afterwards. When the plants are up they should be properly thinned out and kept free from weeds.

They afford variety in the borders, clumps, and other parts of pleasure-grounds.

SEA CABBAGE. See BRASSICA and CRAMBE.

SEA DAFFODIL. See PANCRATIUM.

SEA GRAPE. See COCCOLOBA.

SEA HOLLY. See ERYNGIUM.

SEA LAUREL. See PHYLLANTHUS.

SEA ONION. See SCILLA.

SEA PEA. See PISUM.

SEA PINK. See CERASTIUM.
SEA PURSLANE. See ATRIPLEX.
SEA-SIDE GRAPE. See COCCOLOBA.
SEA LAUREL. See XYLOPHYLLA.
SEA PIGEON-PEA. See SOPHORA.
SEAL, SOLOMON's, See CONVALLARIA.

SEDUM. a genus containing plants of the hardy herbaceous succulent kind.

It belongs to the class and order *Decandria Pentagynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is a five-cleft perianth, acute, erect, permanent: the corolla has five petals, lanceolate, acuminate, flat, spreading: nectaries five; each a very small emarginate scale, inserted into each germ at the base on the outside: the stamina have ten awl-shaped filaments, length of the corolla: anthers roundish: the pistillum has five oblong germs, ending in more slender styles: stigmas obtuse: the pericarpium five capsules, spreading, acuminate, compressed, emarginate towards the base, opening on the inside longitudinally by a suture: the seeds numerous, very small.

The species cultivated are: 1. *S. Telephium*, Orpine Stonecrop; 2. *S. Anacampseros*, Evergreen Orpine; 3. *S. Aizoon*, Yellow Stonecrop; 4. *S. populifolium*, Poplar-leaved Stonecrop; 5. *S. stellatum*, Starry Stonecrop; 6. *S. Cepæa*, Purslane-leaved Stonecrop; 7. *S. dasyphyllum*, Thick-leaved Stonecrop; 8. *S. reflexum*, Yellow Stonecrop; 9. *S. rupestre*, Rock Stonecrop; 10. *S. Hispanicum*, Spanish Stonecrop; 11. *S. album*, White Stonecrop; 12. *S. acre*, Biting Stonecrop, or Wall Pepper; 13. *S. sexangulare*, Insipid Stonecrop; 14. *S. Anglicum*, English or Mild White Stonecrop; 15. *S. annuum*, Annual Stonecrop.

The first has a perennial tuberous root: the stems from one to two feet high and upwards, upright, simple or unbranched, leafy, round, smooth, solid, reddish and often dotted with red: the leaves almost covering the stem, sessile, ovate, fleshy, tooth-serrate, smooth and even, of a blueish green colour: the corymbs terminating, many-flowered, close or heaped together: the flowers deep purple, very rarely white in this climate, though that seems to be the most common colour in some foreign countries. It is a native of Portugal.

There are several varieties, as with purple flowers, with white flowers, with broad leaves, and the Greater Orpine.

The second species has fibrous perennial roots: the stems trailing: the leaves standing alternate round the stems, almost an inch long, and half an inch broad: the flowers in a compact corymb, sitting close on the top of the stem: they are star-shaped, of a purple colour, and appear in July. It is an evergreen; and a native of Germany.

The third has a perennial root, composed of many thick fleshy fibres, from which come out several stalks rising near a foot high: the leaves are alternate on every side, thick, two inches and a half long, and three quarters of an inch broad, and slightly serrate: the flowers bright yellow. It is a native of Siberia, flowering from July to September.

The fourth species has the leaves cordate, thick and fleshy: the stem herbaceous, branched, erect, patulous, even, a foot high: the leaves alternate, remote, only at the ramifications, blunt, fleshy, smooth. When it grows in an open situation, exposed to the sun, the leaves and stalks become of a bright red colour. It is a native of Siberia, and the only hardy Sedum cultivated with us that has a shrubby stalk: the leaves are deciduous. It flowers in July and August, and is proper for a rock plant.

The fifth is a low annual plant: the stalks rise three inches high, dividing at top into two or three parts: the flowers come out singly from the side of the stalk; are white, star-pointed, and succeeded by star-pointed rough capsules. It is a native of Germany, &c.

The sixth species has also an annual root: the stalks six or seven inches high, dividing into smaller branches, which sustain small white flowers growing in large panicles. It is a native of Germany, France, &c.

There is a variety which has the stem more erect, and the lower leaves in threes or fours, the next opposite, and the uppermost alternate.

The seventh has a perennial (biennial) root, composed of small white fibres: the stems numerous, weak, prostrate and creeping, about three inches long or somewhat more, branched, in tufts, round, weak, clammy, leafy: the flowering branches erect: the leaves mostly opposite, closely imbricate, sessile, very thick and fleshy, broader than long, convex on the lower, nearly plane on the upper surface, glaucous often with a tinge of purple; dotted and sometimes having a net of red veins: on the flowering branches they are alternate. It is a native of many parts of Europe, as France, &c.

When introduced into a garden, it propagates itself freely upon walls, in waste places, and about garden pots; and no plant is better adapted to the purpose of decorating rock-work, as it grows without any trouble, in any aspect, multiplying very much by young shoots, and always looks beautiful.

The eighth species has also a perennial root: the stems round, leafy, branched at the base, often hanging down, erect at the top; the leaves scattered, alternate, adnate-sessile, loose at the

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1 Sedum Anacampseros
Evergreen Orpine

2 Sophora Tetraptera
Winged-Podded Sophora

base and produced, erect above, compressed, acuminate, extremely succulent, smooth, rather glaucous, frequently tinged with red; the lower ones turned back; when old they easily fall off: the flowers are in a terminating subcymed panicle, with many-flowered branches, for the most part recurved: the flowers erect, bright yellow. It is a native of Europe, and is common here on walls and thatched roofs, and rocks in the northern counties, flowering in July.

The ninth is a little smaller than the eighth: the leaves closely imbricate (before flowering) in five or six rows, glaucous, flatted a little, acuminate; on the flowering stem somewhat remote, as in that sort, all erect, not bent back at the point. According to Withering, the disposition of the leaves in five or six rows may be best observed by viewing the plant with the ends of the branches opposed to the eye: the panicle subcymed, many-flowered, with the branchlets scarcely reflexed: the flowers of a bright yellow or gold colour, often six-cleft. It is a native of England and Wales, &c., perennial, flowering in July.

This, as well as the above, is cultivated in Holland and Germany to mix with lettuces in salads.

The tenth has a slender, fibrous, perennial root: the stems several, a hand high, reclining at the base, and then erect, round, tinged with red: the leaves, on the flowering stems, pale green dotted with purple, oblong, thickish, round on one side and flat on the other; towards the top, under the flowers, more swelling and shorter: leaves on young plants or barren shoots, in bundles, glaucous, without any purple dots, thinner, from a narrow base widening gradually, and ending in a blunt point: the stems divide at top into a few branchlets, forming a sort of umbel, (or rather cyme,) bearing sessile, star-like white flowers, stained with pale purple from a purple groove running along the petals: these are six, sometimes seven in number, keeled and cusped. It is a native of Spain and Carinthia, flowering in July.

The eleventh species has a perennial, fibrous root: the stems decumbent at bottom, and there throwing out fibres; flowering stems upright, from three inches to a span in height, round, leafy, branched, smooth: the leaves scattered thinly, spreading out horizontally, sessile, cylindrical, very blunt, smooth, fleshy, somewhat glaucous and generally reddish: panicle terminating, alternately branched, subcymose, many-flowered, smooth. It is a native of Europe, on rocks, walls and roofs, flowering in July.

It is eaten by some as a pickle.

The twelfth has also a perennial, fibrous root: the stems numerous, growing in tufts, much branched, decumbent, and creeping at the base, then upright, three inches high, smooth, round, very leafy: the leaves closely imbricate, blunt, flatted a little, from upright spreading, loose at the base: the cymes terminating, solitary, few-flowered: the flowers erect, sessile. It is a native of Europe, flowering in July.

The thirteenth species has the habit of the preceding sort, but is somewhat larger: the leaves are subcylindrical; not ovate, and come out mostly by threes in a double row, and hence appear to be imbricate in six rows; this is most obvious in the young shoots: they are very spreading, loose at the base, and scarcely gibbous: the cyme is leafy: the flowers of a golden yellow colour. It is not acrid. It is a native of many parts of Europe, flowering at the end of June.

The fourteenth has an annual, fibrous root: the stems in tufts, decumbent at the base, smooth, red, leafy: the leaves mostly alternate or nearly opposite, bluntish, somewhat glaucous, produced and loose at the base: the cymes terminating, solitary, almost leafless, racemed: the flowers erect, five-cleft. It is a native of Britain and Norway.

The fifteenth species is also an annual plant, with an erect stalk, seldom rising above two or three inches high: the leaves are of a grayish colour: the flowers are small and white, and grow at the top of the stalk, in a reflexed spike. It is a native of the North of Europe.

Culture.—These plants are all raised without much difficulty, by proper care and attention to have the soil dry and of the poor sandy kind.

Culture in the Orpine sorts.—These may all be readily increased by planting cuttings, during the summer months, in light mould in a shady situation, or in pots placed in similar situations. The plants in the open ground, as well as those in pots, should be kept clean from weeds, and be watered frequently when the weather is dry.

They may likewise be raised by parting the roots, and planting them in a similar manner in the spring or autumn. When the plants are once well established, they spread rapidly, and require little or no care.

Culture in the Stonecrop kind.—These are raised without much trouble, by planting out their trailing stalks in the spring or summer season, which readily take root. They thrive most perfectly on old walls, buildings, or rock-works. Where cuttings or roots of the perennial kinds are planted in some soft mud, placed upon such situations, they quickly take root and spread into the different joints and crevices, covering the whole in a very short time.

The seeds of the annual sorts also, when sown

soon after they become ripe in such situations, soon come up and support themselves without further trouble.

Most of the perennial sorts are kept in the nurseries in full plants, fit for setting out in the borders, pots, &c. either in the spring for flowering the same year, or in the autumn to flower in the following year.

These plants may be planted out in any dryish light soil, in borders, beds, and other places, and in the sides of dry banks, or in any elevated rubbishy soil, as well as in pots to move to different parts occasionally; or also some of the evergreen kinds, to introduce in their pots among winter plants under shelter, to increase the variety. In most sorts, they may also be introduced as rock plants, to embellish artificial rock-works, ruins, and other similar places in pleasure-grounds. The Stonecrops and other low trailing kinds may also be made to occupy the tops of any low walls, pent-houses, sheds, or other low buildings.

The twelfth and thirteenth sorts may likewise be disposed in patches towards the fronts of borders, &c. as they spread thick and tufty close to the ground, and flower abundantly; and being planted in pots, are proper to place in the outside of windows, copings of low walls, and in balconies, and court yards, in assemblage with other low fancy plants; they will closely overspread the surface, and flower profusely as far as they extend.

SELAGO, a genus furnishing plants of the shrubby and under-shrubby kinds.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Aggregatæ*.

The characters are: that the calyx is a one-leafed, four-cleft perianth, (five-cleft,) small, permanent: lower segment larger: the corolla one-petalled: tube very small, filiform, scarcely perforated: border spreading, five-parted, almost equal; the two upper segments smaller; the lowest larger: the stamina have four capillary filaments, length of the corolla, into which they are inserted; the two upper ones longer: anthers simple: the pistillum is a roundish germ: style simple, length of the stamens: stigma simple, acute: there is no pericarpium: corolla (calyx) involving the seed: the seed one or two, roundish.

The species cultivated are: 1. *S. corymbosa*, Fine-leaved Selago; 2. *S. spuria*, Linear-leaved Selago; 3. *S. ovata*, Ovate-headed Selago.

The first has slender woody stems, rising seven or eight feet high, but so weak as to require support; they send out many slender branches: the leaves are short, linear, hairy, coming out in clusters: the flowers small, and of a pure white; appearing in July and August, but not followed by seeds in this climate.

The second species has a suffruticose stem: the leaves alternate, clustered: the spikes ovate-oblong, blunt, closely imbricate; with oblong, membranaceous bractes: the corollas five-cleft, violet; with a long filiform tube: the capsule six-valved. It is biennial, flowering in June.

The third has white flowers, with a yellow spot on the two uppermost segments, and sometimes on all of them, and an orange spot at the mouth of the tube. It is valuable not so much on account of its beauty, as the curious structure of its spikes, and the fragrancy of its flowers. It flowers in June and July, and as well as the rest it is a native of the Cape.

Culture.—They may be increased by cuttings and layers. The cuttings should be made from the young under shoots, and be planted out during the summer months in a bed of fresh earth, covering them close with a bell- or hand-glass, shading them from the sun, and refreshing them now and then with water. They should be gradually hardened, and then transplanted into small pots, placing them in the shade till they have taken root. The layers may be laid down in the autumn or spring, and when well rooted be taken off and planted out in pots, as above. The plants should afterwards be placed out with other hardy greenhouse plants, and about the end of October removed into the dry stove. They only require protection from frost, being treated in the same manner with the hardier sort of greenhouse plants.

They afford ornament and variety in greenhouse collections.

SEMPERVIVUM, a genus containing plants of the succulent, hardy, herbaceous, evergreen, and shrubby perennial kinds.

It belongs to the class and order *Dodecandria Polygynia*, (Dodecagynia,) and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is a six- to twelve-parted perianth, concave, acute, permanent: the corolla has six to twelve petals, oblong, lanceolate, acute, concave, a little bigger than the calyx; the stamina have from six to twelve filaments (or more), subulate-slender: anthers roundish: the pistillum from six to twelve germs, in a ring, erect; ending in as many spreading styles: stigmas acute.

The species cultivated are: 1. *S. tectorum*, Common Houseleek; 2. *S. globiferum*, Globular Houseleek; 3. *S. arachnoideum*, Cobweb Houseleek; 4. *S. montanum*, Mountain Houseleek; 5. *S. arboreum*, Tree Houseleek; 6. *S. Canariense*, Canary Houseleek.

The first has a perennial fibrous root: the root-leaves in form of a full-blown double-rose,

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1 *Semperivum Arachnoideum.*
Cobweb Houseleek.

2 *Strelitzia Regina*
Canna leaved Strelitzia

sessile, wedge-shaped or obovate, somewhat more than an inch long, very fleshy, thick, flat above, a little convex beneath, keeled and whitish, smooth on both sides, the edges fringed with hairs and generally tinged with red, pointed, upright, gradually smaller inwards: offsets on long footstalks, globular, the size of a pigeon's egg or larger, composed of erect leaves lying over each other: the flowering-stem upright, from nine inches to a foot in height, round, fleshy, pubescent, having alternate, lanceolate, thinner leaves on it, of a reddish colour, at top branched and forming a sort of corymb; the branches spreading and bending back: the flowers numerous, clustered, upright, pubescent, flesh-coloured, all growing one way. It is a native of Europe, flowering in July.

The second species has the leaves much narrower, and the heads furnished with a greater number of them than those of the first sort, which grow more compact, and are closely set on their edges with hairs: the offsets are globular, their leaves turning inward at the top, and lying close over each other; these are thrown off from between the larger heads, and, falling on the ground, take root, whereby it propagates very fast: the flower-stalks are smaller, and do not rise so high as those of the former; and the flowers are of a paler colour. It is a native of Russia, Austria, &c. flowering in June and July.

The third has much shorter and narrower leaves than the first: the heads are small and very compact: the leaves are gray, sharp-pointed, and have slender white threads crossing from one to the other, intersecting each other in various manners, so as in some measure to resemble a spider's web: the flower-stalks about six inches high, succulent and round, having awl-shaped succulent leaves placed on them alternately: the upper part divides into two or three branches, upon each of which is a single row of flowers ranged on one side; each composed of eight lanceolate petals, of a bright red colour, with a deep-red line running along the middle; they spread open in form of a star. It is a native of Switzerland and Italy, flowering in June and July.

The fourth species greatly resembles the first, but the leaves are smaller, and have no indentures on their edges: the offsets spread out from the side of the older heads, and their leaves are more open and expanded: the flower-stalk is nine or ten inches high, having some narrow leaves below; the upper part is divided into three or four branches, closely set with deep-red flowers composed of twelve petals, and twenty-four stamens with purple anthers. It is a native of Germany, &c. flowering in June and July.

The fifth rises with a fleshy smooth stalk eight or ten feet high, dividing into many branches, which are terminated by round heads or clusters of leaves lying over each other like the petals of a double rose, succulent, of a bright green, and having very small indentures on their edges: the stalks are marked with the vestiges of the fallen leaves, and have a light brown bark: the flower-stalks rise from the centre of these heads; and the numerous bright-yellow flowers form a large pyramidal spike, or thyrse. It is a native of Portugal, &c. flowers through the winter, commonly from December to March.

The sixth species seldom rises above a foot and a half high, unless the plants are drawn up by tender management: the stalk is thick and rugged, chiefly occasioned by the vestiges of decayed leaves: at the top is a very large crown of leaves, disposed circularly like a full-blown rose, large, succulent, soft to the touch, and pliable, ending in obtuse points which are a little incurved: the flower-stalk comes out from the centre, and rises near two feet high, branching out from the bottom, so as to form a regular pyramid of flowers, which are of an herbaceous colour. It is a native of the Canary Islands, flowering in June and July.

A variety of this with variegated leaves was obtained from a branch accidentally broken from a plant of the plain sort, at Badmington, the seat of the Duke of Beaufort.

Culture.—The different herbaceous sorts are all capable of being increased without difficulty by planting their off-set heads, which should be slipped with a few root fibres to them, and planted in the spring season on rubbish rock-works, or other places, or in pots for variety: and the tender green-house sorts may be raised from cuttings of the branches and from seeds; but the first is the better method.

The cuttings should be made from the smaller branches in the early summer months, and be planted out in pots, or a bed of fine earth, in a warm shaded situation: where the cuttings are succulent, they should be laid in a dry place for a few days to heal over the cut part; they should be shaded from the sun; and those in pots lightly watered in dry weather: when they are become well rooted, they should be carefully removed into separate pots of a middle size, being placed in the green-house. Some forward these plants by means of bark hot-beds.

The seeds of the Canary kind should be sown in the autumn or early spring in pots of light mould, placing them in a garden-frame to protect them from frost, having the air freely admitted in mild weather: when the plants are come up, and have a little strength, they should be removed into small pots and placed in the green-house.

The first sorts are ornamental on walls, buildings, and rock-works, as well as in pots; and the last two kinds among other potted greenhouse plants.

SENA. See CASSIA.

SENECIO, a genus containing plants of the herbaceous, annual, and perennial kinds.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common calycled, conical, truncate: scales awl-shaped, very many, parallel in a cylinder contracted above, contiguous, equal, fewer covering the base imbricatewise, the tops mortised: the corolla compound, higher than the calyx: corollets hermaphrodite, tubular, numerous in the disk: females ligulate in the ray, if any present: proper in the hermaphrodites funnel-form: border reflex, five-cleft: in the females, if any, oblong, obscurely three-toothed: the stamina in the hermaphrodites, filaments five, capillary, very small: anther cylindric, tubular: the pistillum in both: germ ovate: style filiform, length of the stamens: stigmas two, oblong, revolute: there is no pericarpium: calyx conical, converging: the seeds in the hermaphrodites solitary, ovate: pappus capillary, long; in the females very like the hermaphrodites: the receptacles naked, flat.

The species cultivated are: 1. *S. hieracifolius*, Hieracium-leaved Groundsel; 2. *S. Pseudo-China*, Chinese Groundsel; 3. *S. hastatus*, Spleenwort-leaved Groundsel; 4. *S. elegans*, Elegant Groundsel, or Purple Jacobæa.

The first is an annual plant, with a round, channelled, hairy stalk, rising three feet high: the flowers in a state of terminating umbel, composed of dirty-white florets. It is a native of North America, flowering in August.

The second species has a perennial root, composed of some thick fleshy tubers, sending out many fibres on every side; from which come out some large cut leaves shaped like those of the turnep, but smooth: the flower-stalk slender, a foot and half high, sustaining at the top a few yellow flowers. It is a native of the East Indies.

The third has a herbaceous perennial stalk, branching out at the bottom, and rising about two feet and a half high; having narrow leaves at bottom, seven or eight inches long: the upper leaves are smaller, and embracing; they are very clammy: the upper part of the stalk divides into several very long peduncles, each sustaining one yellow flower. It is a native of the Cape, flowering most part of the summer.

The fourth species is an annual plant, having many herbaceous branching stalks, near three feet high: the flowers are produced in bunches on the top of the stalks; are large, the ray of a beautiful purple colour, and the disk yellow. It is a native of the Cape, flowering from June ot July till the beginning of autumnal frosts.

There are varieties with very double purple, and with equally double white flowers. The former is now chiefly cultivated.

There are many other species that may be cultivated for variety.

Culture.—The first and two last sorts are readily increased by planting cuttings of the branches in pots filled with fine mould in the summer season, shading them till they have taken root; and, as the winter approaches, removing them under the protection of the greenhouse, where they should remain till May, when they may be planted out in the borders or clumps.

They may likewise be raised from seed, which should be sown in the spring in pots, and placed in a gentle hot-bed.

The second sort should be more carefully attended, being raised from off-sets, which should be planted in pots in the spring season, and plunged in the hot-bed of the stove, where the plants should be constantly kept.

The first and two last sorts afford variety in borders, and among potted plants; and the second in stove collections.

SENGREEN. See SAXIFRAGA.

SENNA. See CASSIA.

SENNA, BLADDER. See COLUTEA.

SENNA, SCORPION. See EMERUS.

SENSITIVE PLANT. See MIMOSA.

SERRATULA, a genus containing plants of the tall, hardy, herbaceous, perennial kind.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Compositæ Capitatæ*.

The characters are: that the calyx is common oblong, subcylindrical, imbricate, with lanceolate, acute or obtuse, awnless scales: the corolla compound tubulous, uniform: corollets hermaphrodite, equal: proper one-petalled, funnel-form: tube bent in; border ventricose, five-cleft: the stamina have five capillary, very short filaments: anther cylindrical, tubulous: the pistillum is an ovate germ: style filiform, length of the stamens: stigmas two, oblong, reflex: there is no pericarpium: calyx unchanged: the seeds solitary, obovate: pappus sessile, feathered: the receptacle chaffy, flat.

The species cultivated are: 1. *S. Noveboracensis*, Long-leaved Saw-wort; 2. *S. prælta*, Tall Saw-wort; 3. *S. glauca*, Glaucous-leaved Saw-wort; 4. *S. squarrosa*, Rough-headed Saw-wort; 5. *S. scariosa*, Ragged-cupped Saw-wort; 6. *S. spicata*, Spiked Saw-wort.

The first has a perennial root: the stalks several, channelled, seven or eight feet high; the leaves from four to five inches long, and one

inch broad in the middle, slightly serrate, downy on their under side, sessile: the upper part of the stalk divides into peduncles, sustaining purple flowers, which appear at the end of July. It is a native of North America.

The second species has a large, perennial, fibrous root: the stem branching, from four to seven or eight feet high: the leaves seven inches long, and an inch and half broad in the middle, ending in acute points, entire, hairy on their under side, sessile: the flowers in loose bunches at the end of the branches: the calyxes oval, composed of few scales terminating in bristles: the flowers are of a pale purple colour. It is a native of Virginia, Carolina, &c.

The third has a perennial root: the stalks six or seven feet high, purple and channelled: the leaves about three inches long, and an inch and half broad in the middle, ending in acute points, stiff, serrate, and of a light green on both sides: the flowers in a loose terminating corymb, purple, with roundish calyxes. It is a native of Maryland, Virginia and Carolina, flowering in October.

The fourth species has a tuberous root, from which comes out a single stalk, rising near three feet high: the leaves stiff, about three inches long, entire, rough to the touch, pale green on both sides: the upper part of the stalk is adorned with purple flowers, having oblong, rough, prickly calyxes, coming out from the side alternately; and the stalk is terminated by one head larger than the others. It is a native of Virginia, flowering in July and August.

The fifth has a large tuberous root, from which comes out one strong channelled stalk, three or four feet high: the leaves frequent, about three inches long, and half an inch broad: the flowers purple, in a long loose spike, coming out from the side upon pretty long blunt peduncles; they have large rough calyxes composed of wedge-shaped scales. The upper flowers blow first, and appear in August.

The sixth species has a tuberous root, from which comes out a single stalk from two to three feet high: the leaves very narrow, smooth, at bottom more than three inches long, but gradually diminishing to the top, sessile, and placed round the stalk without any order: the flowers purple, smaller than in the fourth and fifth sorts, sessile, and forming a long loose spike. It is a native of North America, flowering from August to October.

Culture.—These plants may all be increased by parting the roots and planting them out in the autumn when the stems decay, or in the spring; but the former is the better season. The old plants should not be parted oftener than every third year, and then not too small.

They are likewise all capable of being increased by seeds, when they can be had good, which should be sown in the autumn or early spring, in a border to the east, in slight drills. When the plants are a few inches high, they should be pricked out in nursery-rows to remain till the following autumn, and then planted out where they are to remain.

They afford ornament in the borders, clumps, &c. being planted to the middle or the back parts.

SERVICE TREE. See SORBUS.

SHADDOCK. See CITRUS.

SHADE, any thing that intervenes to obscure or protect from the rays of the sun. It is effected in various ways in gardening; as by mats, covers, &c.

SHADING OF PLANTS, the art of protecting plants of young and tender growths in seed-beds, &c. from the sun. It is a necessary work on many occasions, in warm, dry, sunny weather in spring and summer, &c. in pricking out various sorts of small young plants from seed-beds into nursery-beds, pots, &c. as well as small cuttings, slips, above-ground off-sets, pipings, &c. as likewise occasionally in transplanting any kind of more advanced plants, flowers, &c. into beds, or pots, in a hot, dry season; and sometimes to seed-beds of particular sorts of small or curious seeds in hot sunny days; also to plants in hot-beds, under frames and glasses, both of young and more advanced growths. It is the most commodiously and effectually performed by garden mats in a sort of awning over the beds, to plants in the full ground, or to those in pots placed close together; or sometimes to seed-beds, either in that way, or by being spread on the surface; in the latter method, being occasionally watered over the mats: or sometimes, in hot dry weather, by some loose straw litter strewed over seed-beds, which by screening the surface from the parching sun, and preserving the moisture in the earth, promotes a more quick, regular, and free germination in the seed; and when the plants are come up, the covering is soon drawn off lightly with a wooden or other rake. To plants under glasses in frames, &c. the occasional shading is effected either by mats spread thinly over the glasses, or sometimes by a little loose, long litter, shaken lightly over them, just during the fierce heat of the sun. In all cases the shade should not be made too thick, so as to darken the plants too much.

In the business of occasional shading, it is in general only to be continued in the warmest time of sunny days, generally longer to plants, cuttings, &c. which have not struck root, than those that are in a growing state; and in common

with all plants in the full ground, or others designed for placing in the open air, where occasional shading is necessary, it should be discontinued on evenings, mornings, and nights, that they may enjoy the benefit of the full fresh air at these times; as also the tender sorts, striking or advancing in growth under glasses, having occasional shading when the sun is powerful, in the warmer part of the day, should remain unshaded before and after that time, that they may receive the necessary beneficial influence of light and air in a proper degree. But in plants, cuttings, slips, &c. that have had occasional shading till they have struck good root, and begin to advance a little in a renewed growth, the shading should be mostly discontinued gradually, especially for those in beds, pots, &c. in the open ground, or others designed for transplantation, or for placing in pots, in the full air for the summer, according to their kinds: but in some small tender plants of slender growth, the occasional shading may probably be necessary in longer continuation, as till they acquire more strength; and to plants remaining all summer in hot-beds, or under frames and glasses, the continuance of occasional moderate shading in hot sunny days will be proper; but in most young plants, cuttings, &c. pricked out or planted as above, and designed for the full ground or open air, not continued under glasses, the having the benefit of occasional shade till well struck, is all they require.

The sorts of plants which require this kind of management are very numerous; but it is constantly mentioned in their culture where necessary.

SHALLOT. See ALLIUM.

SHIFTING OF PLANTS, the business of removing plants in pots from smaller into larger ones, &c. to give them fresh earth or mould. It is necessary occasionally in all plants in pots, to assist them with larger ones according as the advanced growth of the particular sorts renders it proper, and at the same time to supply an additional portion of fresh earth about the root fibres of the plants, to promote their growth; and sometimes for the application of fresh compost, either in part or wholly, from the plants having remained long unremoved, and the old earth in the pots being much decayed, or on account of some defect of growth in the particular plants.

In regard to the necessity of shifting, it is, in some degree, according to the advancing growth of the different sorts of plants: some sorts of a strong free growth require shifting once every year or two; others, more moderate growers, or of more settled growths, once in two or three years; and some large growing kinds, which are advanced to a considerable size, having been occasionally shifted, in their increasing growth, from smaller into larger pots of different proportionable sizes, and some from large pots into tubs, of still larger dimensions, as large plants of the American aloe, orange and lemon tree kinds, &c. in that advanced state sometimes only need occasional shifting once in three or several years, especially when the pots or tubs are capacious, containing a large supply of earth, and are occasionally refreshed with some new compost at top, and a little way down round the sides about the extreme roots. And in some small slow-growing plants, as in many of the succulent tribe, shifting them once in two or three years may be sufficient: other sorts want shifting annually into larger pots, according as they advance in a free growth, as the hardy and tender kinds of herbaceous and shrubby plants, &c. And some of the tender annual flower-plants, cultivated in pots, and forwarded in hot-beds, being planted first in small pots, want shifting, in their increasing growth, into larger sizes, once or twice the same season, as from April to the beginning of June, when being shifted finally into the requisite full-sized pots, they remain during their existence.

But though large-grown plants, either of the shrub or tree kind, as well as other plants of large growths, after being finally stationed in the fullest sized large pots and tubs, succeed several years without shifting, they should in the interval have the top earth loosened, and down round the sides to some little depth, removing the loosened old soil, and filling up the pots, tubs, &c. with fresh earth, settling it close by a moderate watering.

The usual season for occasional shifting such plants as require it, is principally the spring and autumn, as from March to May for the spring shifting; and from August to the end of September for the autumn; though in plants that can be removed with the full balls of earth about the roots, it may be occasionally performed almost at any time; however, for any general shifting, the spring and autumn are the most successful seasons, as the plants then sooner strike fresh root; and many sorts preferably in the spring, by having the benefit of the same growing season, and that of summer.

In performing the business, it is mostly proper to remove the plants from the smaller to the larger pots, with the balls of earth about the roots, either wholly, or some of the outward old earth, the dry or matted radicle fibres only being carefully trimmed away, so as not to disturb the principal roots in the bodies of them, as by this means the plants receive but little check in their growth by the removal. Sometimes, when any particular plants, shrubs, or trees, &c. in their

pots, discover by their tops that they are in a declining state, as probably the defect may be either in the root, or the old balls of earth, it may be proper to shake all the earth entirely away, in order to examine the roots, and to trim and dress them as the case may require, re-planting them in entire fresh compost or mould.

In preparing for the business, where necessary to give larger pots, &c. it is proper to provide them of suitable sizes in some regular gradation larger than the old ones, according to the nature and growth of the plants, the whole being placed ready, with a proper quantity of fresh compost earth in proportion to the number and size of the plants intended to be shifted: then let those plants intended to be removed with balls, be taken out of their old pots separately, with the whole balls or clumps of earth about the roots as entire as possible; and when large or tolerably full, with a knife trim off some of the outward loosest earth, and the extreme fibres of the roots; but when small, and adhering together compactly, the whole may be preserved entire; and in either case, where there are very matted, dry, or decayed fibres surrounding the balls, they should be trimmed as it may seem necessary: in those of a fresh lively growth, the loose straggling parts only should be cut away: the requisite pruning, trimming, or dressing in the heads or tops should also be given where it may seem proper, according to the state of growth, and the natural habit of the different plants; but many sorts require little or none.

Having prepared the intended pots for the reception of the plants, by placing some pieces of tile or oyster-shell, &c. loosely over the holes at bottom, and laid in a little fresh earth two, three, or four inches deep or more, according to the size of the pot, the plant should be set in with its ball of earth, as above, filling up around it with more fresh mould, raising it an inch or two over the top of the ball; and giving directly a moderate watering to settle the earth close about the ball and roots regularly in every part, in a proper manner: in such cases where the ball in particular plants appears very compactly hard and binding, it may be proper to loosen it a little, by thrusting a sharp-pointed stick down into the earth in different parts, giving it a gentle wrench to open the earth moderately; or sometimes it may also be proper to trim away some of the old earth on the top and sides; then planting it as above, and filling up round and over the ball with fresh earth, and watering it afterwards.

In shifting hardy or tender, shrubby, succulent, or herbaceous plants, when any appear of a sickly, weak, or unhealthy growth, it may be advisable to clear off a considerable part of the outward old earth from the balls about the roots, or, in some cases, to shake it wholly away, that the defects in the growths, occasioned either by faults in the roots or in the earth, may be removed by pruning out any decayed or bad parts of the roots, and re-planting them wholly in fresh earth.

Sometimes particular sorts of plants in pots require shifting, more for the advantage of having fresh earth, than for want of new or larger pots; and as in this case some of the same pots may be still of an eligible size to repot them in, these pots should be well cleaned from all adhering parts of the old earth, and be replenished with entire new at the time of re-potting the plants; which being removed out of their pots, either with the entire balls about the roots, and part of the old mould cleared off all round, to admit of a larger portion of fresh earth in the pot at re-planting; or in some, appearing of an infirm or declining habit, the whole balls of old earth displaced clean to the roots; then having furnished the pots with fresh earth, the plants should be replaced in them, filling up the pot regularly with a sufficiency of the same fresh mould, and finishing with a moderate watering to settle the whole close about their roots.

After shifting, when the plants are not watered at the time, a moderate watering both to the earth in the pots to settle it close about the roots, and in most sorts highly over the tops or heads of the plants, should be given, in order to wash off any foulnesses; then the pots of plants should be set in their respective stations in the garden, &c.: the hardy kinds, if warm sunny weather, may be placed in a shady border for two or three weeks, till they have struck fresh root in the new earth: the tender sorts should be disposed in their places among the green-house and stove plants, or to have the benefit of shade in the middle of hot sunny days, till fresh struck, or probably some of the more tender particular sorts may require to be plunged in a hot-bed or bark-bed, especially some of the stove kinds: some principal sorts of the more curious or tender green-house plants, in order to expedite their fresh-rooting more effectually; and sometimes tender annuals in hot-beds, potted in their early young growth, may require to be replunged in the hot-bed to fresh strike, and forward them till June; but generally all the full ground or open air plants only require a little occasional shade in hot dry weather the first two or three weeks, and some shifted with full balls about the roots only need occasional watering: afterwards, on the whole, both the hardy and tender kinds should have repeated moderate waterings given them, according to their kinds.

SHOT INDIAN. See CANNA.

SIDA, a genus containing plants of the exotic, tender, herbaceous, perennial kind, for the hot-house.

It belongs to the class and order *Monadelphia Polyandria*, and ranks in the natural order of *Columniferæ*.

The characters are: that the calyx is a one-leafed perianth, angular, half-five-cleft, permanent: the corolla has five petals, wider above, emarginate, fastened below to the tube of stamens: the stamina have very many filaments, united below into a tube, in the apex of the tube divided: anthers roundish: the pistillum is an orbicular germ: styles five or more; or else one many-cleft: stigmas headed: the pericarpium is a roundish-angular capsule, composed of five or more cells, (corresponding with the number of the styles or stigmas,) two-valved, awnless, acuminate or horned, opening above, or close, and finally separating: the seeds solitary, two, three, or five, roundish, mostly acuminate, convex on one side, angular on the other, fastened to the interior suture.

The species chiefly cultivated are: 1. *S. rhombifolia*, Rhomb-leaved Sida; 2. *S. periplocifolia*, Great Bindweed-leaved Sida; 3. *S. triquetra*, Triangular-stalked Sida; 4. *S. Abutilon*, Broad-leaved Sida; 5. *S. alba*, White-flowered Sida; 6. *S. cordifolia*, Heart-leaved Sida.

The first has the leaves lanceolate rhomb-shaped with the axils two-thorned. It is a native of the East Indies and Jamaica.

The second species has an annual root: the stem from two to four feet high, erect, simple, round, pubescent, sometimes divided towards the top into spreading branches: the leaves petioled, alternate, smooth, somewhat wrinkled, hoary beneath: the panicle terminating, half the length of the stem, erect, almost simple, spreading: the peduncles simply subdivided, alternate, filiform, the last one-flowered: the flowers pale, sometimes light purple. It is a native of the West Indies and Ceylon.

The third species is a shrub three feet in height, with subtomentose branches, having each of the three sides hollowed out with a blunt groove: the leaves cordate without angles, very soft, obscurely tomentose, bluntly serrate, acuminate: the peduncles axillary, one-flowered: the flower is of a yellow colour. It is a native of the West Indies.

The fourth species is in height about four feet, putting out some side branches towards the top: the leaves soft and woolly: the flowers axillary, on long peduncles. It is annual, and a native both of the East and West Indies, Virginia, and Siberia.

The fifth has the leaves round: the corolla is white with purple stigmas, and the tips of the petals purplish. It is annual.

The sixth has a hairy annual root: the stem simple, more than three feet high, sending out several erect branches from the sides: the leaves two inches and a half long, and two broad, of a light green colour, soft to the touch, on very long hairy footstalks: the calyx hairy: beaks of the seeds, when the corolla falls, prominent, in a bundle the length of the calyx: the capsules from seven to ten: the flowers small, of a pale obscure yellow- or sulphur-colour. It is a native of the East Indies and the Cape.

Culture.—These plants may be increased by seeds, which should be sown upon a moderate hot-bed in the early spring, or in pots deposited in them. In the first case, when the plants have attained some growth, they should be removed to another hot-bed and set out four inches apart each way, or into separate pots, replunging them in the hot-bed, being shaded till they have taken new root; a large proportion of free air being admitted in fine weather, and also frequent waterings: they should afterwards be gradually hardened to bear the open air in the summer season.

Some of them may also be raised from offsets and cuttings planted in pots in the summer season.

The fourth sort is sufficiently hardy to bear the open air: the seeds should be sown where the plants are to remain, as they do not bear transplanting well. It is an annual plant.

Some of the species do not flower till the second year; of course they should be placed in the stove in the autumn, and be managed during the winter as other tender exotic plants of the same nature.

They afford ornament among other potted plants in the stove, and the fourth sort in the borders.

SIDERITIS, a genus containing plants of the under shrubby, and shrubby exotic kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leafed perianth, tubular, oblong, about half-five-cleft: segments acute, almost equal: the corolla one-petalled, almost equal: tube cylindrical, throat oblong, roundish: upper lip erect, bifid, narrow: lower lip trifid; lateral segments sharper, commonly smaller than the upper lip; middle segment roundish crenate: the stamina have four filaments, within the tube of the corolla, shorter than the throat, two of which are smaller: anthers roundish, two twin: the pis-

tillum is a four-cleft germ: style filiform, usually longer than the stamens: stigmas two: upper cylindrical, concave, truncate; lower membranaceous, shorter, sheathing the upper: there is no pericarpium: calyx cherishing the seeds in its bosom: the seeds four.

The species cultivated are: 1. *S Canariensis*, Canary Iron-wort: 2. *S. Cretica*, Cretan Iron-wort; 3. *S. Syriaca*, Sage-leaved Iron-wort.

The first has the stem five or six feet high, sending out several woody branches covered with a soft down: the leaves on long footstalks; in young plants often five or six inches long, and two and a half broad near their base; but in older plants not more than half that size; they are very woolly, especially on their under side, which is white, but their upper surface is of a dark yellowish green: the flowers, which grow in thick whorled spikes at the end of the branches, are of a dirty white, and appear early in June: the plants frequently produce flowers again in autumn. It is a native of the Canaries and of Madeira.

The second species is a shrub with divaricating branches, very thickly tomentose and snow-white: the leaves cordate, crenate, tomentose on both sides, obtuse, very thickly tomentose and snow-white beneath, green above: the spike from the division of the branches, peduncled, pendulous, tomentose, snow-white together with the calyxes, which are blunt: the flowers about eight in each whorl. It is a native of the island of Crete or Candia.

The third has a short woody stem, with a few branches about a foot long: the leaves thick, wedge-shaped, very downy and white: the flowers in whorls towards the end of the branches, yellow with smooth downy calyxes. It has the appearance of a Sage, but is longer. The whole plant is covered with a very close white cotton. It is a native of the Levant, flowering from June to September.

There are other species that may be cultivated.

Culture.—These plants may be increased by seeds, cuttings and layers.

The seeds should be sown in pots in the spring, plunging them in a moderate hot-bed: when the plants have had some growth they should be removed into separate small pots filled with light mellow mould, being afterwards treated as other shrubby green-house plants.

The cuttings and layers may be planted out or laid down in the summer season, and when sufficiently rooted managed as the other sorts.

The third sort may be increased by planting the slipped heads either in pots or a shady border, to be afterwards removed into pots for protection in the winter in a frame.

They afford variety in green-house collections among other evergreen potted plants.

SIDEROXYLON, a genus containing plants of the shrubby, evergreen, exotic kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Dumosæ*.

The characters are: that the calyx is a five-cleft perianth, small, erect, permanent: the corolla one-petalled, wheel-shaped: segments five, roundish, concave, erect: toothlet cusped, serrate, at the base of each division of the petal, tending inwards: the stamina have five awl-shaped filaments, length of the corolla, alternate with the toothlets: anthers oblong, incumbent: the pistillum is a roundish germ: style awl-shaped, length of the stamens: stigma simple, obtuse: the pericarpium is a roundish berry, one-celled: the seeds five.

The species cultivated are: 1. *S. inerme*, Smooth Ironwood; 2. *S. lycioides*, Willow-leaved Ironwood.

The first in its native situation rises to the height of an apple-tree; but in this climate it is rarely more than eight or ten feet high: the wood is so heavy as to sink in water, and being very close and hard, the name of Iron-wood has been given it: it divides into many branches, which are covered with a russet bark: the leaves about three inches long, and an inch and half broad in the middle, ending in points at both extremities, placed without order on the branches, having footstalks an inch long: they are smooth, of a lucid green, and continue all the year: the flowers come out in clusters from the side of the branches upon short footstalks, which branch out into several smaller, each sustaining a single flower, which is small and white. It flowers in July, and is a native of the Cape.

The second species is a tree with axillary solitary spines and alternate leaves: the peduncles axillary, one-flowered, very many, a little longer than the petioles: the calyx five-cleft, obtuse: the corolla funnel-form, five-cleft, obtuse; with the segments concave, scarcely unfolded: nectary five-leaved, serrate, short, each lobe to each segment of the corolla: the stamens ten, awl-shaped, length of the nectary; anthers sagittate: germ globular: style filiform; stigma very small: the berry black, globular, from three- to five-celled, commonly abortive. It is a native of South America.

Culture.—These plants may be increased by seed procured from abroad, which should be sown in the spring in pots filled with fresh mould, and plunged in the tan-bed of the stove: when the plants have some growth, they should be removed into separate pots and be replunged in the bark-bed.

They are sometimes raised from slit-layers and cuttings in the summer season; but they are tedious in forming roots in this way, and the plants are not so good.

The first is tender, affording variety in the stove; but the last is more hardy, and may sometimes be introduced in the shrubbery borders in warm sheltered situations.

SILENE, a genus containing plants of the hardy herbaceous, of the annual and perennial kind.

It belongs to the class and order *Decandria Trigynia*, and ranks in the natural order of *Caryophyllei*.

The characters are: that the calyx is a one-leafed perianth, ventricose, five-toothed, permanent: the corolla has five petals: claws narrow, length of the calyx, margined: border flat, obtuse, often bifid: nectary composed of two toothlets in the neck of each petal, forming a crown at the throat: the stamina have ten awl-shaped filaments, alternately inserted into the claws of the petals, and later than the other five: anthers oblong: the pistillum is a cylindrical germ: styles three, simple, longer than the stamens: stigmas bent contrary to the sun's apparent motion: the pericarpium is a cylindrical capsule, covered, one- or three-celled, opening at top into five or six parts: the seeds very many, kidney-form.

The species cultivated are: 1. *S. armeria*, Common or Lobel's Catchfly; 2. *S. quinquevulnera*, Variegated Catchfly; 3. *S. pendula*, Pendulous Catchfly; 4. *S. muscipula*, Spanish Catchfly; 5. *S. viridiflora*, Green-flowered Catchfly; 6. *S. nutans*, Nottingham Catchfly; 7. *S. fruticosa*, Shrubby Catchfly.

The first is an annual plant with erect stalks, a foot and half high, for more than an inch below each joint very glutinous: the lower leaves broad, oblong, smooth, sessile: the flowers in terminating bunches, standing erect, and forming a kind of umbel. It is a native of Denmark, &c. flowering in July and August.

There are varieties with a bright purple flower, with a pale red, and with a white flower.

In the second, from a small fibrous annual root arise several flaccid spreading stems, round, hairy, and a little viscid; as are also the leaves in a slight degree: numerous flowers spring in an alternate order from the bosoms of the upper leaves, on pedicels which are erect, or but little divaricated even when the fruit is ripe: the petals are remarkable for the deep red spot in their centre, like a drop of blood. It is a native of the South of Europe.

The third is an annual plant, from whose root come out several branching stalks, near a foot and half long, which trail upon the ground, opposite: the leaves oval, acute-pointed: the flowers come out singly from the axils, upon short peduncles; they are large, and of a bright red colour, resembling those of the common Wild Red Campion. It is a native of Sicily and Crete or Candia, flowering in May and June.

The fourth species has a biennial root: the stalk round, clammy, a foot and half high, having swelling joints: the leaves narrow and smooth, growing round the stalk in clusters: the upper part of the stalk divides into spreading branches by pairs, and has red flowers coming out singly from the axils, and sessile: the plant is extremely viscid. It is a native of the South of France, &c.

The fifth has a biennial root: the lower leaves roundish and hollowed like a spoon: those upon the stalks obtuse, and standing by pairs, threes or fours round the stalks; they are deep green, smooth and sessile: the stalks round, smooth, from two to three feet high: the flowers in loose spikes at the top, of a green colour. It is a native of Spain, &c. flowering in June and July.

The sixth species has a somewhat woody perennial root: the stems several, simple, (according to Mr. Woodward frequently branched from the root,) a foot or more in height, erect, leafy, round, pubescent, jointed at the base, viscid in the upper part, terminating in a forked panicle, the summit and branches of which all droop towards one side: the leaves lanceolate acute, quite entire, pubescent on both sides, of a palish green; the radical ones inclining to obovate, and forming thick tufts: the flowers drooping, white, of a delicate texture. It is a native of several parts of Europe, flowering in June and July.

The seventh has the stem low, shrubby, dividing into several short branches: the leaves smooth, ending in acute points: the flower-stalks rise about a foot high, and divide into spreading panicles, sustaining two and three flowers, of an herbaceous white colour. It is a native of Sicily, flowering in June and July.

Culture.—The annual and biennial sorts may be raised by seeds, which should be sown in the spring or autumn seasons, where the plants are to grow; but the latter is the better time. Some sow at both seasons, which may be a good practice. The seed should be put in in patches in the borders, clumps, &c.: when the plants are up they should be thinned to two or three plants in each clump, and be kept clean from weeds. With the biennial sorts it is sometimes the practice to sow them in beds, and when the plants are up to remove them into nursery-rows

till the autumn, when they are planted out in the borders, &c.

The perennial sorts may likewise be increased from seeds in the same manner; but the usual way is by slips of the heads, and parting the roots, planting them out in shady places in the spring or early summer months. The shrubby sort may be increased by slips and cuttings of the branches or shoots, which should be planted out in similar situations in the spring and summer seasons.

They all afford ornament and variety in the clumps and borders of pleasure-grounds.

SILPHIUM, a genus containing plants of the tall-growing, herbaceous, perennial kind.

It belongs to the class and order *Syngenesia Polygamia Necessaria*, and ranks in the natural order of *Compositæ Oppositifoliæ*.

The characters are: that the calyx is common ovate, imbricate, squarrose: scales ovate-oblong, bent back in the middle, prominent every way, permanent: the corolla compound radiate: corollets hermaphrodite in the disk many: females in the ray fewer: the proper of the hermaphrodites one-petalled, funnel-form, five-toothed; the tube scarcely narrower than the border:—of the females lanceolate, very long, often three-toothed: stamina in the hermaphrodites: filaments five, capillary, very short: anther cylindrical, tubular: the pistillum in the hermaphrodites: germ round, very slender: style filiform, very long, villose: stigma simple:—in the females, germ obcordate: style simple, short: stigmas two, bristle-shaped, length of the style: there is no pericarpium: calyx unchanged: the seeds in the hermaphrodites none:—in the females solitary, submembranaceous, obcordate, with the edge membranaceous, two-horned, emarginate: the receptacle chaffy: chaffs linear.

The species cultivated are: 1. *S. laciniatum*, Jagged-leaved Silphium; 2. *S. terebinthinum*, Broad-leaved Silphium; 3. *S. Asteriscus*, Hairy-stalked Silphium; 4. *S. trifoliatum*, Three-leaved Silphium.

The first has a perennial root: the stem twice the height of a man, as thick as the thumb, quite simple, smooth below, above rugged with brown tubercles and white spreading hairs, round: the leaves petioled, two feet in length and a foot in breadth, embracing at the base, pinnatifid; segments on each side four or five, distant, narrow, tooth-sinuate, rugged, with very solid ribs raised on both sides; margin of the upper leaves purplish: the calyx of ten scales, ending in large awl-shaped spines: the petals of the ray thirty, length of the calyx, with a bifid slender style: the florets of the disk yellow, many, separated by chaffs, attenuated at the base, with a simple style. It is a native of North America, flowering from July to September.

The second species has two or three stems, strong, upright, annual, smooth; panicled above, but without any branches throughout the whole length, being beset with distant leaves: radical and lower cauline leaves large, heart-shaped, upright, rough, sharply toothed on the edges, and ciliated with very short hairs; they are very veiny, but not wrinkled: the footstalks are long, and embrace the stem at their base: the stem-leaves are similar, but scarcely hearted at the base, and the others are more oblong, and half embrace the stem: the peduncles are elongated, round, and mostly leafless; though a few of them are furnished with two opposite leaflets: the terminal flower on the stem flowers first, and when this begins to seed the lateral peduncles of the panicle begin to extend and proceed to flower: the smell of the flower, which is moderately large, and yellow, is similar to that of the Sun-flower. It is a native of North America, flowering in August and September.

The third has a perennial root: the stem four or five feet high, thick, solid, set with prickly hairs, and having many purple spots: the lower leaves alternate; upper opposite and sessile, rough, about two inches long, and an inch broad near the base, having a few slight indentures on their edges: the upper part of the stem divides into five or six small branches, terminated by yellow radiated flowers like those of the perennial Sun-flower, but smaller, having generally nine florets in the ray. It is a native of North America, flowering from July to September.

The fourth species has a perennial and woody root: the stems annual, rising five feet high or more in good land, of a purplish colour, and branching towards the top: the leaves oblong, rough, having some sharp teeth on the edges; they are from three to four inches long, and almost two broad; towards the bottom of the stem they stand by fours at each joint; higher up they are by threes, and at the top by pairs, sitting close to the stems: the flowers upon pretty long peduncles, solitary. It is a native of many parts of North America, flowering from July to October.

Culture.—They are all readily increased by parting the roots and planting them out in the autumn or spring, where they are to remain in the borders and clumps. They may also be raised by planting the slips in the same manner: they should be afterwards managed as the perennial Sun-flower.

They afford a good variety and effect among other perennial plants in the summer season.

SILVER BUSH. See ANTHYLLIS.
SILVER TREE. See PROTEA.
SIMPLER'S JOY. See VERBENA.

SINAPIS, a genus containing a plant of the hardy herbaceous annual kind.

It belongs to the class and order *Tetradynamia Siliquosa*, and ranks in the natural order of *Siliquosæ* or *Cruciformes*.

The characters are: that the calyx is a four-leaved perianth, spreading: leaflets linear, concave-channelled, cruciform-spreading, deciduous: the corolla four-petalled, cruciform: petals roundish, flat, spreading, entire: claws erect, linear, scarcely the length of the calyx: nectareous glands four, ovate: one on each side between the shorter stamen and the pistil, and one on each side between the longer stamens and the calyx: the stamina have six awl-shaped filaments, erect: two of them opposite, the length of the calyx, and four longer: anthers from erect spreading, acuminate: the pistillum is a cylindrical germ: style length of the germ, height of the stamens: stigma capitate, entire: the pericarpium is an oblong silique, torose below, rugged, two-celled, two-valved: partition for the most part twice the length of the valves, large, compressed: the seeds many, globular.

The species cultivated are: 1. *S. alba*, White Mustard; 2. *S. nigra*, Common or Black Mustard.

The first has an annual root: the stem strong, hard, nearly round, upright, branched, striated or finely grooved, set with numerous stiffish hairs pointing downwards, from a foot and half to two feet in height: the leaves petioled, alternate, pale green, rough with strong hairs on both sides, all deeply indented or lobed, the terminating segment very broad and large, and frequently a pair of small wings on the petiole: the lower ones deeply pinnatifid; the upper ones sublyrate: the flowers on loose racemes or bunches at the ends of the branches, on horizontal pedicels, which have four grooves or corners, and strong hairs pointing downwards. It is a native of Germany, &c.

It is generally cultivated in gardens as a sallad herb, with Cresses, Radishes, &c. for winter and spring use.

The second species has an annual small root: the stem upright, round, streaked, the upper part smooth, three or four feet in height, with many distant spreading branches: the leaves petioled, variously lobed and toothed; those next the root lyrate, rugged; on the stem smooth, the upper ones frequently simple, lanceolate and sharply toothed; the very uppermost quite entire. It is a native of Europe.

It is the flour of the seed of this plant that affords the common mustard for the table.

Culture.—The first sort is sown along with other small sallad herbs at all times of the year, sometimes every week or fortnight, in a bed or border of light earth, sown generally in shallow drills very thick, covering it very thinly with earth; and in winter, and early in spring, during cold weather, in hot-beds. The herbs are always cut for use whilst in the seed-leaf and but a few days old; otherwise they become too strong and rank-tasted for use. See SALLAD HERBS and SMALL SALLADING.

In order to have seed of this sort for garden use, it should be sown on an open spot of ground in March or April, either thinly in drills a foot asunder, or broad-cast all over the surface, and the plants be left to run up to stalk, when they will furnish ripe seeds in August.

But in order to raise the plants for the seed for mustard, the seeds should be sown in the spring, any time in March, in some open situation, either in the kitchen-garden or in open fields: in either case, having dug or ploughed the ground, the seed should be sown broad-cast all over the surface, and raked or harrowed in lightly; or it may be sown in shallow drills a foot asunder, and be slightly covered in: the plants soon come up, and when they have four or more leaves an inch or two broad, if they stand very thick, those sown in the broad-cast way particularly should be hoed and thinned, leaving them six or eight inches asunder, cutting up all weeds, repeating the operation once or more if necessary; after this the plants will soon spread and cover the ground, and shoot fast up to stalks for flowers and seed, which ripen in July or August, when the stalks should be cut or pulled up, and the seed, being properly hardened, and dried in the pod, should either be thrashed out directly, or stacked up dry and thrashed at occasional opportunities afterwards; but the first is the best method.

SISYMBRIUM, a genus containing a plant of the hardy herbaceous kind.

It belongs to the class and order *Tetradynamia Siliquosa*, and ranks in the natural order of *Siliquosæ*, *Cruciformes* or *Cruciferæ*.

The characters are: that the calyx is a four-leaved perianth: leaflets lanceolate-linear, spreading, coloured, deciduous: the corolla four-petalled, cruciform: petals oblong, spreading, commonly less than the calyx, with very small claws: the stamina have six filaments, longer than the calyx; of these two opposite a little shorter: anthers simple: the pistillum is an oblong filiform germ: style scarcely any: stigma obtuse: the pericarpium is a silique, long, incurved, gibbous, round, two-

celled, two-valved: valves in opening straightish, partition a little longer than the valves: the seeds very many, small.

The species is *S. Nasturtium*, Common Water Cress.

It has perennial roots, consisting of long white fibres, the lowermost fixed in the soil, the rest suspended in the water: the stems spreading, declining or floating, angular, branched, leafy: the leaves alternate, pinnate, somewhat lyrate, the terminating and upper leaflets being the largest: all the leaflets roundish, more or less heart-shaped, smooth, shining, waved or toothed, frequently tinged with a purplish brown hue: the flowers white, in a corymb, soon lengthened out into a spike: the pods shortish, on horizontal pedicels, but the pods themselves recurved upwards: the stigmas nearly sessile: but according to Curtis, the root is annual. Withering marks it as biennial. It is a native of Europe, Asia, &c.

Culture.—This may be effected by parting the roots, or by seed. In the first method, while the plants are young, a quantity of slips should be made with root-fibres to them, and be planted out immediately in a shallow, trickling, watery situation, when they will readily strike roots, seed, and increase themselves.

The seed should be collected during the summer season, and sown in the same places; or, which is better, the plants, with the ripened seeds upon them, be thrown into them, where they will strike root, and shed their seeds for future increase.

These plants are in much esteem as winter and spring sallad herbs.

SISYRINCHIUM, a genus containing plants of the flowery perennial kind.

It belongs to the class and order *Monadelphia Triandria*, and ranks in the natural order of *Ensatæ*.

The characters are: that the calyx is a common ancipital spathe, two-leaved: valves compressed, acuminate: proper several, lanceolate, concave, obtuse, one-flowered: the corolla one-petalled, superior, six-parted: segments obovate with a point, from erect spreading: three outer alternate, a little wider: the stamina have three filaments, united into a subtriquetrous tube shorter than the corolla, distinct at the top: anthers bifid below, fastened by the back: the pistillum is an obovate inferior germ: style three-sided, length of the tube: stigmas three, thickish, awl-shaped at the top, erect: the pericarpium is an obovate capsule, rounded, three-sided, three-celled, three-valved; with the partitions contrary: the seeds several, globular.

The species are: 1. *S. Bermudiana*, Iris-leaved Sisyrinchium; 2. *S. anceps*, Narrow-leaved Sisyrinchium.

The first has a fibrous root, from which arise some stiff sword-shaped leaves, four or five inches long and half an inch broad, of a dark green colour: from among these comes out the stalk (scape) six inches high; it is compressed, and has two borders or wings running the whole length, and three or four spear-shaped leaves embracing it; these grow erect, and are hollowed like the keel of a boat: the stalk is terminated by a cluster of six or seven flowers, on short peduncles, and enclosed in a two-leaved, keel-shaped sheath, before they open; they are of a deep blue colour with yellow bottoms, which, when fully expanded, are an inch over. It is a native of Bermuda.

The second species has a perennial fibrous root, from which arise many very narrow spear-shaped leaves, about three inches long, and scarcely an eighth of an inch broad, of a light-green colour: the stalks about three inches high, very slender, compressed and bordered, having short, narrow, sword-shaped, embracing leaves: they are terminated by two small pale-blue flowers, inclosed in a two-leaved sheath, upon longer peduncles than those of the first sort, flowering about the same time. It is a native of Virginia.

It is observed, that the leaves, stalks, and flowers of the first sort are three times as large as in the second, and the sheath incloses six or seven flowers; whereas the second has rarely more than two, and these expand only for a short time in the morning, while in the former they continue open the whole day.

Culture.—These plants may be increased by seeds and parting the roots: in the former method the seeds of the first sort should be sown in the autumn as soon as they become ripe, on a border which has an eastern aspect, in drills at three or four inches distance, covering them about half an inch with fine mould: they should afterwards be kept clean from weeds with care. They succeed best in a loamy soil in a shady situation, and where the ground has not been manured.

In the latter sort the seeds should be sown in pots, in order that they may be protected in the green-house.

The first affords ornament in the large open borders and clumps, and the latter among other green-house plants.

SIUM, a genus containing a plant of the hardy, herbaceous, esculent kind.

It belongs to the class and order *Pentandria*

Digynia, and ranks in the natural order of *Umbellatæ* or *Umbelliferæ*.

The characters are: that the calyx is an universal umbel, various in different species: partial spreading, flat: involucre universal many-leaved, reflex, shorter than the umbel, with lanceolate leaflets: partial many-leaved, linear, small: perianth proper scarcely observable: the corolla universal uniform: floscules all fertile: proper of five inflex-cordate, equal petals: the stamina have five simple filaments: anthers simple: the pistillum is a very small germ, inferior: styles two, reflex: stigmas obtuse: there is no pericarpium: fruit subovate, striated, small, bipartite: the seeds two, subovate, convex and striated on one side, flat on the other.

The species cultivated is *S. sisarum*, Skirret.

It has the root composed of several fleshy tubers as large as a man's little finger, and joining together in one head: the lower leaves are pinnate, having two or three pairs of oblong leaflets terminated by an odd one: the stalk rises a foot high, and is terminated by an umbel of white flowers, which appear in July, and are succeeded by striated seeds like those of Parsley, ripening in autumn. It is a native of China, &c.

It was formerly much cultivated for the roots, which were eaten boiled, and stewed with butter, pepper, and salt; or rolled in flower and fried; or else cold with oil and vinegar, being first boiled.

Culture.—It may be raised either by seeds or slips from the roots, but the first is the best method, as in the latter mode the roots are apt to become sticky: the seeds should be sown about the beginning of April, either in broadcast over the surface, or in drills, the ground being previously well dug to a good depth; light and rather moist land being chosen for the purpose. The plants mostly appear in five or six weeks, and when they can be sufficiently distinguished by their leaves, the ground should be well hoed over, in the same manner as for carrots, the plants being properly thinned out to the distance of five or six inches. The hoeing should be repeated as often as necessary, in dry weather.

In the autumn when the leaves begin to decay the roots will be fit for use, and will continue so till the spring.

In the offset method, the old plants should be dug up in the spring before they begin to shoot, the side shoots being then slipped off with an eye or bud to each, planting them in rows a foot apart, and four or five inches distant in the rows; they should afterwards be cultivated as the others.

These roots are prepared by boiling, and eaten in the same manner as above, or as carrots and parsnips. They are wholesome, but not in such request as formerly.

SLIPS, such portions of plants as are slipped off from the stems or branches for the purpose of being planted out.

A number of plants, both of the woody and herbaceous kinds, are propagated by slips, which is effected in the woody kinds by slipping off small young shoots from the sides of the branches, &c. with the thumb and finger, instead of cutting them off with a knife, but there is no material difference, in the success or future growth, between slips and cuttings, only the former in small young shoots is more proper to be slipped off by the hand, which in numerous small, shrubby plants will grow; but is more commonly practised on the lower ligneous plants, such as sage, winter-savory, hyssop, thyme, southernwood, rosemary, rue, lavender, and others of low shrubby growths. The best season of the year for effecting the work is generally in spring and beginning of summer, though many sorts will grow if planted at almost any time, from the spring to the latter end of the summer, as shown in speaking of their culture.

In performing the work of slipping in these sorts, the young shoots of but one year's growth, and in many sorts the shoots of the year should be chosen as growing the most readily, even when to plant the same summer they are produced, especially the hard-wooded kinds: but in the more soft-wooded plants, the slips of one year's growth will also often readily grow; being careful always to choose the moderately growing side-shoots situated on the outward part of the plants, from three to six or eight inches long, slipping them off close to the branches, and clearing off the lower leaves; then planting them either in a shady border, if in summer, and watered, or so as they can be occasionally shaded in hot sunny weather, especially small slips, inserting the whole two parts of three in the ground, giving occasional water, in dry warm weather, till properly rooted; and then towards autumn, or in spring following, transplanting them where they are to remain.

But in planting slips of the shoots of tender shrubby exotics of the green-house and stove, many sorts require the aid of a hot-bed or bark-bed, to promote their emitting roots more effectually, as shown in their respective culture; but some others of the shrubby kinds, such as geraniums, will root freely in the natural earth in summer; and many of the herbaceous tribe, producing bottom-rooted offsets for slips, as aloes, &c. also readily grow, either with or

without a hot-bed; but where there is the convenience of hot-beds in which to plunge the pots of slips of tender plants, it runs them off more expeditiously; and most hot-house plants in particular require that assistance.

But many shrubby plants growing into large bunches from the root of the small under-shrubby kinds, as thyme, savory, hyssop, sage, &c. as well as those of larger growth, as roses, spiræas, raspberries, and numerous other sorts, may be slipped quite to the bottom into separate plants, each furnished with roots, and planted either in nursery-rows, or at once where they are to remain.

And as to the slipping of herbaceous plants, various sorts multiply by the roots, &c. into large bunches, which may be slipped into many separate plants, by slipping off the increased suckers or offsets of the root, and in some sorts by the offsets from the sides of the head of the plants, and in a few sorts by slips of their bottom shoots, as well as of the stalks and branches in plants of bushy growth; but the greater part by slipping the roots, as in many of the bulbous-rooted tribe and numerous fibrous-rooted kinds of plants.

The slipping of the bulbous plants is performed in summer when their leaves decay, the roots being then taken up, slipping off all the small offsets from the main bulb, which are generally soon planted again in nursery-beds for a year or two. See Bulbous Roots.

In the fibrous-rooted sorts, the slipping should generally be performed in the spring or early part of autumn, which may be effected either by slipping the outside offsets with roots, as the plants stand in the ground; or more effectually, by taking the whole bunch of plants up, and slipping them into several separate parts, each slip being furnished also with roots, planting them, if small, in nursery-rows for a year, to gain strength; or such as are strong may be planted at once where they are to remain. See the Culture of the different sorts.

SMALLAGE. See Apium.

SMALL SALAD HERBS, such young tender herbs as are made use of through the year for the purpose of furnishing salads. For this use several young seedling herbs of a warm nature are in request to mix with the larger principal Salad Herbs, as lettuces, endive, and celery, in order to improve their flavour and wholesome quality.

The sorts mostly in use are cresses, mustard, radish, rape, and turnep; also sometimes cabbage-lettuce for winter and early spring use; all of which for this use are in perfection when quite young, that is, not more than a week or ten or twelve days old, whilst they remain mostly in the seed-leaf, being then cut up close to the ground for use; for, being mostly of a warm relish, in which consists their chief excellence for winter and spring salads, if suffered to grow large, and run into the rough leaf, they become of a disagreeable, strong, hot taste; but when used as above, they eat exceedingly tender, with an agreeable warm flavour.

For the purpose of salading, these plants may be obtained young at all times of the year, in spring and summer in the open ground, and in winter under the shelter of frames and glasses, and occasionally on hot-beds.

This sort of salading is procured by sowing the seeds of the different plants at different times throughout the whole year.

Winter and Spring Culture.—In the winter and spring it may be raised either in hot-beds or in the open borders, and, according as it may be required, early or late; but when it is required as early as possible, it must be sown in hot-beds under frames and lights, &c. or in a bed or border of natural earth under glasses.

The sowing should be made on hot-beds any time in December, January, or February; and where a considerable supply is daily required, may be continued sowing every week or fortnight in hot-beds till March, or during the cold weather, for which a moderate hot-bed of dung should be made for one, two, or more garden-frames, but only half a yard or two feet depth of dung, according to the temperature of the season, as the heat is only required to bring up the plants quickly, and forward them a week or two in growth, placing a frame directly thereon, and moulding the bed all over with light rich earth, five or six inches thick, making the surface level and smooth; when, if it is to be forwarded as much as possible, directly sow the seed, which may be done either in drills as shallow as possible, about two or three inches broad, and flat at the bottom, and three inches asunder, sowing the seeds of each sort separate and very thick, so as almost to cover the ground, only just covering them with earth; or, to make the most of the bed, it may be sown all over the surface, previously smoothing it lightly with the back of the spade, the different sorts separately, and all very thick; and after pressing them all even and lightly down with the spade, covering them very thinly with earth, by sifting over as much light mould as will only just cover the seed; and as soon as the sowing is performed in either method, putting on the lights: the seeds soon come up, as in two or three days or less, being careful at this time to give vent to the steam

arising in the bed, as well as to indulge the plants with plenty of free air daily, either by tilting the lights in the back or front, according to the temperature of the weather, or by drawing the lights a little down, or taking them quite off occasionally in mild days at first; for the hot-bed being yet new, there will be a considerable steam arising; and the salading coming up very thick, unless due vent be given to pass off the steam and admit fresh air, they will be apt either to burn or fog (as the gardeners term it), and mould off as fast as they come up. Such hot-beds, however, as are not fresh made, do not require this precaution; but in new-made beds it must be strictly observed till the salading is all fairly come up, and as long as the strong steam continues: the plants will mostly be fit for use in a week or ten or twelve days from the time of sowing the seed.

In order to have a proper succession, the sowing in the hot-beds should be repeated every week or fortnight during the cold weather; the same hot-bed sometimes retaining its heat will admit of two sowings, by sowing again as soon as the first crop is gathered: however, to obtain a regular supply daily, it is necessary to continue making fresh hot-beds occasionally.

Where only a small quantity may be wanted at a time, and there is the convenience either of cucumber and melon hot-beds, or a hot-house, &c., some seed of each sort may be sown in pots or boxes, and placed in these hot-beds or the stove, just to bring up the plants fit for use.

Where there are not frames and glasses, hand- or bell-glasses may be used, or the bed be arched over with low hoop-arches, in order to cover with mats every night, and in bad weather.

And where there are no hot-beds, in cold weather, early in the spring, part of a warm border, or a bed of light earth in a sunny situation may be prepared, for garden-frames and lights, hand-glasses, &c. raising the ground somewhat to the sun; and having dug it, and raked it fine, sow the seed as above, covering it lightly with earth; and having set on the frames and glasses, the seeds will soon come up, and the salading be ready a considerable time sooner than in the open ground.

Culture in the full Ground.—From about the end of February, or beginning of March, according to the forwardness or mildness of the season, Small Salading may be sown in the open ground, repeating the sowings every week or ten days; the first sowing being performed on a warm border; continuing the sowings in that situation till the beginning or middle of April, when it may be sown in any of the open quarters, and in which the sowings may be repeated weekly, or once a fortnight, as required; but according as the hot weather approaches, sowing in a somewhat shady situation.

The ground for each sowing in the different situations should be properly dug, and the surface raked smooth and even.

These sowings are mostly made in shallow drills, which should be drawn with a small hoe either with the corner, or hold edge-ways downward, horizontally, drawing the drills along evenly, as shallow as possible, and flat or level at bottom, at three or four inches asunder, in which the seed should be put evenly all along the bottom, each sort separate, and very thick, covering them in evenly with the finest of the mould, not more than a quarter of an inch deep; or if the smaller seeds are but just covered, it is sufficient; for when sown very thick, if deeply covered with mould, the plants do not rise regularly.

In these early spring sowings, on cold nights and all bad weather it is proper to cover the ground, both before and after the plants begin to rise, with large mats, which will be better if supported on low hoop-arches, or ranges of pegs stuck in the ground just high enough to support the mats a little from the earth, by which a more effectual as well as forward crop is produced.

In the later sowings, when dry warm weather commences, it is proper to give occasional waterings.

It is likewise sometimes necessary, where the surface of the ground becomes crusted, from wet, &c. as the plants rise thick, to slightly brush over the surface with the hand or a soft broom, so as to reduce the surface mould a little, and promote their coming up.

Summer Sowings.—When the sowings are practised in summer, they should be made more frequently, and the ground be kept watered occasionally, both before and after the plants are come up.

Autumn Sowings.—The sowings may be continued in the open ground all September and October, also occasionally in November in mild seasons; and until towards the middle of October they may be made in any open situation; but from the middle or latter end of October and in November they must be on warm south borders, performing the sowings as above; and in cold nights bestowing a covering of mats, or hand-glasses, &c. repeating the sowings every week or ten days, or a fortnight, as required.

In gathering young salading, it should be cut carefully close to the ground while quite young, in performing which, a large pair of scissars is very convenient.

In order to have good seed, some plants should be preserved annually for the purpose.

SMILAX, a genus containing plants of the shrubby, climbing, evergreen kinds.

It belongs to the class and order *Dioecia Hexandria*, and ranks in the natural order of *Sarmentaceæ*.

The characters are: that in the male the calyx is a six-leaved perianth, spreading, bell-shaped: leaflets oblong, approximating at the base, bent back, and spreading at the tip: there is no corolla, unless the calyx be taken for it: the stamina have six simple filaments: anthers oblong: female—calyx as in the male, deciduous: there is no corolla, the pistillum is an ovate germ: styles three, very small: stigmas oblong, bent back, pubescent: the pericarpium is a globular berry, three-celled: the seeds two, globular.

The species cultivated are: 1. *S. aspera*, Rough Smilax; 2. *S. excelsa*, Tall Smilax; 3. *S. Sarsaparilla*, Medicinal Smilax or Sarsaparilla; 4. *S. laurifolia*, Bay-leaved Smilax; 5. *S. tamnoides*, Black Briony-leaved Smilax; 6. *S. herbacea*, Herbaceous Smilax; 7. *S. China*, Chinese Smilax; 8. *S. Pseudo-China*, Bastard Chinese Smilax.

The first has a perennial root, composed of many thick fleshy fibres, spreading wide, and striking deep: the stems several, slender, angular, armed with short crooked spines, and having claspers on their sides, by which they fasten themselves to any neighbouring plant for support, and rise five or six feet high: the leaves stiff, heart-shaped, and acute-pointed, three-quarters of an inch broad at the base and about two inches long, of a dark green, marked with five longitudinal nerves, and the edges set with a few short reddish spines: the flowers axillary in short bunches, small and whitish: those on the female plants are succeeded by red berries which ripen in autumn, but sometimes black. It is a native of the South of France, Italy, &c.

There is a variety which has the leaves eared at the base.

The second species has the roots like those of the preceding: the stems four-cornered and prickly, mounting to the tops of trees by their claspers: the leaves two inches long, and an inch and three quarters broad at the base, having five longitudinal nerves, but no spines on their edges: the flowers and fruit are like those of the first sort. It is a native of Syria.

The third has a perennial root divided into several branches, which are somewhat thicker than a goose quill, straight, externally brown, internally white, and three or four feet in length: the stems shrubby, long, slender, scandent: the leaves alternate, pointed, with long tendrils at the base: the flowers lateral, usually three or four together upon a common peduncle. It is a native of America, flowering in July and August.

The fourth species has a thick stalk, taper, rising by claspers ten or twelve feet high: the leaves thick, three inches and a half long, and an inch and half broad: the flowers axillary in round bunches, and succeeded by black berries. It is a native of Virginia and Carolina, flowering in July.

The fifth has the stems taper: the leaves four inches long, and two inches and a half broad at their base, having seven longitudinal veins: the flowers come out in long loose bunches from the side of the stalks, and the berries are black. It is a native of North America, flowering in June and July.

In the sixth the leaves have the form of the hederaceous plants, but not the consistence, for they are thin: the little umbels of small flowers are on very long slender peduncles, from the bosom of the leaves. It is a native of North America, flowering in July.

The seventh has a taper stem, very strong, armed with short stiff spines, and rising twenty feet high by their claspers: the leaves thick, four inches long, and three inches and a half broad at their base, ending in an obtuse point, and having five longitudinal veins: the flowers in close bunches: the berries red: the root horizontal, creeping far and wide, with oblong tubers, knobbed and warted, sometimes branched, pale or reddish within, half a foot long, roundish, scattered. It should be chosen full, heavy, and compact, of a reddish colour, and free from rottenness; for it is much subject to be gnawed by worms. It is a native of China, Cochinchina, and Japan.

The eighth species has a shrubby stem, very long, slender, with few scandent branches: the leaves small, the lower cordate, the upper ovate-lanceolate, three-nerved, quite entire, flat, with the margin bent back: the flowers in lateral umbels: the berries red: the root is horizontal, simple, thick, short, tubercled, with many long undivided fibres: but according to Browne, small, and divided into a number of slender branches. It is a native of Virginia, Jamaica, China, &c.

Culture.—The six first hardy sorts may be increased by slipping the roots, layers, and seed.

In the first mode the stalks arising from the roots should be slipped with roots to each in the autumn, and be planted out either in nursery-rows for a year or two, or, which is better, where they are to grow.

In the layer method, the stalks should be laid down in the common manner in autumn, and when well rooted, in the autumn following be taken off and planted out as above.

The seed should be obtained from abroad, and

be sown in pots filled with fine mould in the spring, being plunged in a hot-bed to forward their coming up: when the plants have attained some growth they should be planted out and managed as the others.

The two last tender sorts may be increased by layers of the young shoots, and dividing the roots, which should be laid down, or planted out in the spring season in pots, in order to have the culture of other woody green-house plants of the same nature.

The layers will be ready to take off in the spring following.

The first sorts are proper for shady situations, borders, &c. and the latter afford variety in the green-house collections.

SMYRNIUM, a genus containing a plant of the herbaceous esculent kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ* or *Umbelliferæ*.

The characters are: that the calyx is an universal umbel, unequal, becoming daily bigger: partial erect: the involucre universal none: partial none: perianth proper scarcely apparent: the corolla is universal uniform: floscules of the disk abortive: proper of five lanceolate petals, slightly bent-in, keeled: the stamina have five simple filaments, length of the corolla: anthers simple: the pistillum is an inferior germ: styles two, simple: stigmas two, simple: there is no pericarpium: fruit oblong, striated, bipartile: the seeds two, lunulate, on one side convex, marked with three angles, flat on the other.

The species cultivated is *S. Olusatrum*, Common Alexanders.

It has a biennial root, fleshy, branched: the whole herb of a pale bright green, often of a sickly yellowish cast, smooth, succulent, in flavour something like Celery, but more strong and bitter: the stem round, strong, deeply grooved: the upper leaves ternate, lower triternate; leaflets wide, varying in form, gashed and serrate, subpetioled: the common petiole dilated at the base, ventricose, and nerved: umbels terminating, globular, many-rayed: the flowers small, numerous, irregular, greenish yellow: the fruit large, black, remarkably gibbous, deeply grooved. It is a native of France, Spain, Italy, &c.

Culture.—These plants are raised from seeds, which should be sown in the spring in any light soil and open situation, in shallow drills, fifteen or eighteen inches asunder; and when the plants are come up two or three inches high, be thinned out to six or eight inches distance in the rows, to give them room to shoot up strong; when earth must be drawn up about them gradually, in order to blanch or whiten them a little below, that they may be more crisp and tender for autumn and winter use; but as in the spring following they shoot out again vigorously, some earth should be hoed up close about each plant, and in three or four weeks they will be blanched fit for use.

It is used as a culinary plant, when blanched, in the same manner as celery, and is of a warm aromatic quality.

SOIL, the mould or earth in which plants grow. For the general purposes of gardening, those of the dry, light, friable, loamy kinds are the most valuable, especially when they have been well impregnated and enriched with manure. See EARTH, COMPOST, AND MANURE.

SNAIL-FLOWER. See PHASEOLUS.

SNAIL-TREFOIL. See MEDICAGO.

SNAKE-GOURD. See TRICOSANTHES.

SNAP-DRAGON. See ANTIRRHINUM.

SNAP-TREE. See JUSTICIA.

SNOWBALL-TREE. See VIBURNUM.

SNOWBERRY. See CHIOCOCCA.

SNOWDROP. See GALANTHUS.

SNOWDROP-TREE. See CHIONANTHUS.

SOAP-BERRY. See SAPINDUS.

SOAPWORT. See SAPONARIA.

SOLANUM, a genus containing plants of the herbaceous, shrubby, and tuberous-rooted, esculent kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Luridæ*.

The characters are: that the calyx is a one-leafed perianth, half-five-cleft, erect, acute, permanent: the corolla is one-petalled, wheel-shaped: tube very short: border large, half-five-cleft, from reflex flat, plaited: the stamina have five awl-shaped filaments, very small: anthers oblong, converging, subcoalescent, opening at the top by two pores: the pistillum is a roundish germ: style filiform, longer than the stamens: stigma blunt: the pericarpium is a roundish berry, smooth, dotted at the top, two-celled; with a convex fleshy receptacle on each side: the seeds very many, roundish, nestling.

The species cultivated are: 1. *S. Lycopersicum*, Love-Apple, or Tomato; 2. *S. Æthiopicum*, Ethiopian Nightshade; 3. *S. Melongena*, Large-fruited Nightshade, or Egg Plant; 4. *S. Dulcamara*, Woody Nightshade, or Bitter-sweet; 5. *S. verbascifolium*, Mullein-leaved Nightshade; 6. *S. Pseudo-Capsicum*, Shrubby Nightshade, or Winter Cherry; 7. *S. quercifolium*, Oak-leaved Nightshade; 8. *S. mammosum*, Dug-fruited Nightshade; 9. *S. Indicum*, Indian Nightshade; 10. *S. Carolinense*, Carolina Nightshade; 11. *S. sodomeum*, Black-spined Nightshade; 12. *S. sanctum*, Palestine Nightshade; 13. *S. tuberosum*, Tuberous-rooted Nightshade, or Common Potatoe.

Painted by Sol. Edwards London Published May 1.1800 by G.Kearsley Fleet Street Engraved by F.Sansom

1 *Solidago stricta* Willow leaved Golden Rod. 2 *Senecio elegans* Double purple Groundsel 3 *Spartium junceum.* Spanish Broom

The first is an annual plant, with an herbaceous, branching, hairy stalk, rising to the height of six or eight feet if supported, otherwise the branches will fall to the ground: the leaves pinnate, of a very rank disagreeable odour, composed of four or five pairs of leaflets terminated by an odd one, cut on their edges, and ending in acute points: the flowers axillary on pretty long peduncles, each sustaining several yellow flowers, forming a single long bunch. The fruit is smooth, but varies in form, size and colour, from which Miller has formed two sorts.

The first of these is commonly cultivated in the South of Europe to put into soups and sauces, to which it imparts an agreeable acid flavour: the fruit is very large, compressed both at top and bottom, and deeply furrowed all over the sides, and of a red or yellow colour.

The latter round, about the size of a large cherry, either yellow or red. It is a native of South America, flowering from July to September.

The second species has an annual root: the stem stiffish: the leaves a hand in length, and blunt: the fruit red, large, depressed, so deeply furrowed as to be in a manner cut into lobes, hard: the branches diffused: the leaves ovate-oblong, sinuate-repand: the flowers solitary and violet. It is a native of China.

The third has an annual stem, thick, twisted, two feet high, with the branches reclining: the leaves ovate, sinuate, large, few, scattered, on thick petioles: the flowers pale violet; peduncles axillary, thickened, bent down, one-flowered, most commonly solitary, but not unfrequently two or three together: the berry large, shining, two-celled, many-seeded, esculent. It is a native of Asia, Africa, and America.

There are varieties with oblong violet-coloured fruit, with an oblong white large fruit, with a globular violet-coloured fruit, and with a globular white or variegated fruit.

The fourth species has a perennial root, woody, according to Dr. Beddoes, smelling like the Potatoe: the stem shrubby, roundish, branched, twisted and climbing to the height of several feet: the leaves alternate, petioled, ovate-lanceolate, quite entire, smooth, soft, veiny; the lower cordate, the upper more or less hastate: the flowers in racemes or cyme-shaped panicles, but not properly in cymes, opposite to a leaf or terminating, nodding, very elegant, purple with two green dots at the base of each segment, and the segments reflexed: the berries elliptic, scarlet, very juicy, bitter and poisonous. It is a native of Europe, Africa, &c. flowering in June and July.

There are varieties with flesh-coloured, with white flowers, and with variegated leaves.

The fifth is an unarmed tree, above the height of a man, with a trunk as thick as the human arm: but according to Miller it only rises with a smooth shrubby stalk six or eight feet high, covered with a brown bark, and divides into many branches, which have spear-shaped leaves three inches and a half long and an inch and half broad; they have a few sinuated indentures on their edges, and end in acute points; they are smooth, and of a light-green colour: the flowers are produced in small umbels from the sides of the stalks, standing erect; they are pretty large, white, and the petal is cut into five star-pointed segments. It is a native of America.

The sixth rises with a strong woody stalk four or five feet high, and divides into many slender stiff branches, having spear-shaped leaves turning backward: the flowers are white, and grow in small umbels, or singly on the side of the branches, to which they sit close; they appear from June to September, and are succeeded by berries as large as small cherries, which ripen in winter. It is a native of the island of Madeira.

There are varieties with red, and with a yellowish fruit.

The seventh has the stems angular, erect, rugged: the leaves oblong, decurrent into the petiole, veined, smooth, rugged beneath, pinnatifid: the peduncles branched: the corollas violet-coloured, blunter than in Dulcamara, with two greenish spots at the base of each lobe: anthers yellow, shorter than the style: the berries ovate. It is a native of Peru, flowering in July.

The eighth species rises with a prickly herbaceous stalk three or four feet high; the spines are strong and crooked; the leaves are large, angular, woolly, and armed with the like spines; the flowers are produced in bunches from the side of the stalks; they are of a pale blue colour, and are succeeded by yellow fruit, the shape and size of a Catherine Pear inverted. The plant is annual here. It grows common in all the West India Islands, where it is called Bachelor's Pear.

The ninth has the stem shrubby, two or three feet high, sending out several woody branches armed with short, strong, yellowish spines: the leaves an inch and half long, and an inch broad, woolly on both sides, and angularly indented, armed with spines on both sides along the midrib: the flowers come out in longish bunches from the side of the stalks, and are blue: the berries round, of a gold colour, as large as cherries. It is a native of the East and West Indies.

The tenth species has the stem in a manner shrubby, but yet annual: the leaves rugged, scarcely tomentose, entire at the base, sinuate

with sharpish angles, and spines on the midrib, not at the sides: the racemes longer than the leaves, loose, simple: the berries round, the size of a large pea, yellow when ripe. It is a native of Carolina, flowering in July.

The eleventh has a strong thick shrubby stalk, which rises from two to three feet high, sending out many short thick branches, closely armed with short strong yellow spines on every side: the leaves are about four inches long and two broad; are cut almost to their midrib in obtuse segments, which are opposite, regular, and formed like winged leaves; these segments have several obtuse indentures on their edges; are of a dark green colour, and armed with the same sort of spines as those on the stalks, on both sides: the flowers come out in small bunches on the side of the branches, are blue, appearing in June and July, and are succeeded by round yellow berries, as large as walnuts. It grows naturally at the Cape of Good Hope.

The twelfth species has the stem tomentose, ash-coloured, with thick straight short yellowish prickles, tomentose except at the end: the leaves ovate, shorter on one side of the base, tomentose, thick, blunt; the young ones pinnately sinuate, whitish at the edge, having three prickles on the rib: the petioles are prickly underneath: the peduncles from the side of the stem: the primary pedicel with the calyx spiny, the rest male and unarmed: the corolla, like that of Borage, purplish-blue. It is a native of Palestine.

The thirteenth is well known for its tuberous root: the stem from two to three feet in height, succulent, somewhat angular, striated, slightly hairy, frequently spotted with red, branched; the branches long and weak: the leaves interruptedly pinnate, having three or four pairs of leaflets, with smaller ones between, and one at the end larger than the rest; the leaflets are somewhat hairy, and dark green on the upper surface: the flowers are either white or tinged with purple; or, according to Gerarde, of a light purple, striped down the middle of every fold or welt with a light show of yellowness: the fruit is a round berry, the size of a small plum, green at first, but black when ripe, and containing many small flat, roundish, white seeds. It is probably a native of Peru.

The principal varieties may be distinguished into two kinds—as the red-rooted and white-rooted sorts; the subvarieties of which are extremely numerous; but for garden purposes the following are the most useful:

The Early Dwarf-red—the Round-red—the Oblong-red—the Pale-red—the Blood-red—the Irish-red, or Painted Lord—Old Winter-red—Rough-red—and Smooth-red.

Early Forcing Potatoe—the Early Dwarf-white—Brown Early—Cumberland Early—Early Scot—Golden Dun—Early Champion—White Blossom—Manly White.

Kidney White and Red—Red-nosed—True White—Flat White—Superfine White Early.

Culture.—The three first species, which are annual, may be raised from seed, which should be sown in the early spring on hot-beds moulded over to the depth of six or seven inches with light rich mould, in drills, or pots plunged into the beds. When the plants come up, they should be properly thinned, have a pretty free admission of air, and occasional waterings; and the Love Apple kinds, when they have attained some growth, as five or six inches, and the weather becomes settled warm, should be removed into the open ground, planting them in a warm sheltered border, placing them at a considerable distance. Some may be trained against a south fence to have the advantage of the full sun: they should always be supported by some means or other to show themselves, and ripen their fruit. But the egg plants should be pricked out when a few inches in height into another hot-bed prepared for the purpose, at the distance of four or five inches; and some may be put in separate pots and plunged in the bed, giving water and shade till they are fresh rooted: the waterings should be duly repeated, and fresh air freely admitted when the weather is fine: it may also be requisite to remove them with balls about their roots on to a third hot-bed in order to have them very fine and strong: the frame should be raised as they advance in growth, and when the weather becomes fine and hot they should be gradually hardened, and finally set out in the pots, &c. where they are wanted.

The fourth sort may be increased by layers and cuttings, which may be laid down or planted out in the autumn or spring, where they will be well rooted by the following autumn, when they may be taken off and removed into nursery-rows, or where they are to grow.

The eight following sorts may be increased by seeds, which should be sown thinly in rich light earth in the early spring in small pots, plunging them in the hot-bed under frames and glasses, watering them frequently, when the plants will soon come up, admitting fresh air daily; and when the plants are about two inches high, they should be pricked out upon another hot-bed, giving water and shade till they are fresh-rooted; and some may be put into pots, plunging them in the bed. As the warm weather advances, they should be gradually hardened to the open air, so as to be set out into it about the middle of the summer.

They should afterwards be managed as other shrubby exotic greenhouse plants.

These plants are very ornamental among other potted plants; and the first is cultivated for the fruit as a pickle: the fourth is also ornamental in the borders, &c.

Culture in the Potatoe Kind.—The last sort is highly valuable for its tuberous esculent root, which is well known under the title of Potatoe.

These roots may be obtained for use plentifully almost the year round: the early sorts being planted forward in the spring, often afford tolerable crops fit to take up in June and July following, especially in rich warm grounds; but the main crops are permitted to continue growing till autumn, as about the latter end of October or beginning of November, when the stalks or haulm begin to decay, when the roots will be arrived to full maturity; and being then taken out of the ground, and housed in some close dry apartment, keep in good perfection for eating all winter and spring, until the arrival of the new crops in the following summer.

All the varieties may be cultivated with success in any open situation. They delight in a moderately light dry soil and open situation, which should be enriched and rendered light with dung.

The plants are increased by the root, either whole or cut in pieces, each cutting forming a proper set or plant: but they may likewise be raised from seed to gain new varieties.

The general season for planting is from about the middle or the latter end of February to the middle of April; the early sorts, for forward crops, being planted in the latter end of February or early in March, but for the general crops, March, and the first fortnight in April, is the most proper planting season, especially in moist land, as, if planted earlier, and much wet should succeed, it would rot the sets, more particularly if cuttings; though in cases of necessity, where the ground is not ready, they may be planted any time in April, or even in May, and yield tolerable crops by October.

The ground should be dug over for the reception of the plants to one full spade deep.

As to the planting, it may be performed by means of a dibble, by holeing in with a spade, or drilling in with a hoe, bedding in, &c. in rows two feet asunder, twelve or fifteen inches distant in each row, and not more than four or five inches deep.

Dibble-planting.—This is performed either with a common large garden dibble, blunted at the bottom, making holes about four or five inches deep, at the distance before mentioned, dropping one set in each hole as you go on, and striking the earth over them.

The surface of the ground should afterwards be raked perfectly even.

Drill-planting.—In this mode the drills may be formed either with a large hoe, two feet asunder, and four or five inches deep, in which drop the sets, a foot asunder, and cover them in with the earth equally the depth of the drill.

Holing-in planting.—This is performed with a spade. A man having a light handy spade, and beginning at one end of the line, takes out a spit of earth, forms a small aperture four or five inches deep, another person directly following after drops a set in the hole, the earth of the next spit immediately covers it up, and so on to the end.

Furrow-planting.—This is performed by the spade, by turning over or taking out a spit of earth all along, putting in the dung, and then dropping the sets in the furrow immediately upon it, and with the next spit turning the earth in upon the sets of the first; and in another furrow, two feet from this, dropping another row of sets, which are covered in as above, and so on till the whole is finished.

Trenching-in.—This is sometimes practised in light ground, and is effected as the person proceeds in digging or trenching the ground, being trenched in the common way, each trench two spades wide, and one spade deep, placing one row of potatoes in each trench: beginning at one end of the ground, opening a trench the proper width and depth, as above, then paring in the top of the next trench deeply, putting it with some good dung in the bottom of the first, levelling it evenly, then digging along about half the width of the next or second trench, turning the earth into the first upon the dung, only two or three inches in depth, and upon which lay the potatoe-sets in a row along the middle a foot or more asunder; then digging along the rest or whole width of the said second trench a moderate spade deep, turning the earth of it into the first trench, over the sets, three or four inches deep; this done, dung the bottom of the open trench, and proceed with the digging and planting as before; and thus continue trench and trench to the end.

Bedding-in.—This is sometimes done in low wettish land, for the sake of raising the beds, and sinking the alleys deep enough to drain off the too copious moisture, and is thus performed: The ground is divided into four, five, or six feet wide beds, with alleys two or three feet wide between bed and bed; and the beds being dug, the potatoe sets are placed upon the surface in rows lengthwise; and then the alleys

dug out a spade deep, casting the earth over the sets about three or four inches thick; or the alleys may be first dug out to raise the beds, and the sets then planted with a dibble in the common method: thus by either of these methods, in wet ground, the alleys being sunk, and the beds raised, the alleys drain off the redundant moisture, which might rot the sets before they begin to sprout.

This method of planting is sometimes performed on grass sward, marking out beds as above, with alleys between of proportionable width; then, without digging the beds, the potatoe sets are placed immediately upon the sward, at proper distances; the alleys being then dug and the spits turned grass-side downward upon the beds over the sets, covering them the proper depth as above, in which, if any additional depth is wanted, it may be supplied from the under earth of the alleys; and thus the sets being between two swards, grow, and often are productive of very good crops if permitted to have full growth.

In the after-management where weeds begin to overrun the ground, two or three hoeings should be given to kill them and loosen the surface of the soil; and where the plants have some growth, some hoe up a ridge of earth close to each side of every row of plants in the first or second hoeing, to strengthen their growth more effectually, and render them more prolific, as the bottom of the stalks so landed up generally emitting roots in the earth that become productive of potatoes the same as the principal roots.

In October, when the potatoes are full grown, they should be wholly taken up before they are attacked by frost, and deposited in some dry apartment for keeping: some may however be taken up before for occasional use: this business is usually performed by a three-pronged fork.

When it is intended to raise new varieties from seed, some of the first-flowering plants should be marked, the seed should be gathered in autumn when full ripe, and in the March or April following sown in some light soil, in an open situation, in shallow drills, a foot asunder; and when the plants come up, they should be kept clear from weeds till autumn, when, about the end of October or beginning of November, the roots may be taken up, selecting the finest and largest, which preserve in sand till spring; then plant them in the common way, and by autumn following they will have made proper increase, and attain full perfection; when their properties must be determined.

SOLDANELLA, a genus containing a plant of the low herbaceous perennial kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Precie*.

The characters are: that the calyx is a five-parted perianth, straight, permanent; segments lanceolate: the corolla one-petalled, bell-shaped, widening gradually, straight: mouth torn into many clefts, acute: the stamina have five awl-shaped filaments: anthers simple, sagittate: the pistillum is a roundish germ: style filiform, length of the corolla, permanent: stigma simple: the pericarpium is an oblong capsule, round, obliquely striated, one-celled, opening by a many-toothed top: the seeds numerous, acuminate, very small: the receptacle columnar, free.

The species is *S. alpina*, Alpine Soldanella.

It has a perennial fibrous root: the leaves almost kidney-shaped, about three quarters of an inch over each way, of a dark green colour, on long footstalks: among these arises a naked flowerstalk or scape, about four inches long, sustaining at the top two small open bell-shaped flowers, with the brim cut into many fine segments like a fringe: the most frequent colour is blue, but it is sometimes snow-white. It flowers in April, and the seeds ripen in July. It is a native of the Alps.

There is a variety which has all the parts smaller; the petiole is shorter and more slender, and the leaves are not so much rounded, but gradually widen from the petiole.

Culture.—This is increased by parting the roots in the autumn about September, planting them in pots or in a cool shady situation, where the soil is of a moist loamy kind, being frequently watered when the season is dry, and kept from the sun.

The seeds soon after they become ripe may also be sown in pots or boxes filled with the above sort of mould, being placed in the shade, and frequently watered. The plants rise in the spring, and in the autumn following should be removed into separate pots, to have the protection of a frame in winter. They succeed best in a northern aspect.

These plants afford variety among other potted plants.

SOLDIER-WOOD. See MIMOSA.

SOLIDAGO, a genus containing plants of the tall, herbaceous, flowering, perennial kind.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is oblong, imbricate, common: scales oblong, narrow, acuminate, straight, converging: the corolla is compound radiate: corollets hermaphrodite tubular, very many, in the disk:—female ligu-

late, fewer than ten, (commonly five) in the ray: proper of the hermaphrodite funnel-form, with a five-cleft, patulous border:—female ligulate, lanceolate, three-toothed: the stamina in the hermaphrodites: filaments five, capillary, very short: anthers cylindrical, tubular: the pistillum in the hermaphrodites: germ oblong: style filiform, length of the stamens: stigma bifid, spreading:—in the females: germ oblong: style filiform, length of the hermaphrodite: stigmas two, revolute: there is no pericarpium: calyx scarcely changed: the seeds in the hermaphrodites solitary, obovate-oblong: seed-down capillary:—in the females very like the others: the receptacle flattish, naked.

The species cultivated are: 1. *S. Virgaurea*, Common Golden-rod; 2. *S. Canadensis*, Canadian Golden-rod; 3. *S. altissima*, Tall Golden-rod; 4. *S. Mexicana*, Mexican Golden-rod; 5. *S. viminea*, Twiggy Golden-rod; 6. *S. bicolor*, Two-coloured Golden-rod; 7. *S. rigida*, Hard-leaved Golden-rod; 8. *S. cæsia*, Maryland Golden-rod; 9. *S. flexicaulis*, Crooked-stalked Golden-rod; 10. *S. sempervirens*, Narrow-leaved Evergreen Golden-rod.

The first has a perennial root, of long simple fibres: the stem very various in height, from ten inches to three feet, commonly branching into a panicle, more or less flexuose, never entirely stiff and straight, leafy, angular, striated, a little downy; at the base round and often purple: the leaves elliptic-lanceolate, somewhat rugged, and stiffish; those next the root wider, on longer petioles, and more widely serrate; stem-leaves for the most part indistinctly crenate-serrate, sometimes almost quite entire, varying in size, often recurved; the upper ones gradually diminishing into lanceolate downy bracles: all somewhat hairy, or covered with short stiff down, paler underneath; footstalks winged: the flowers in terminating and axillary erect clusters or corymbs, forming a dense leafy pubescent panicle, which varies extremely as to luxuriance and number of flowers; in a barren soil and on mountains being shorter, more dense and less compound. They are of a golden colour. It is a native of Europe, Siberia, and Japan, flowering from July to September. It has sometimes the names of Wound-wort and Aaron's rod.

There are several varieties; as the purple-stalked broad-leaved, which has the stalks stiff, purplish brown, two feet high: the panicles axillary and terminating; each flower on a long slender footstalk, pale yellow, appearing at the beginning of August: the leaves lanceolate, almost four inches long, and a quarter of an inch broad, deeply serrate, pale green beneath.

The Common Golden-rod, which has the lower leaves ovate-lanceolate, two inches long and an inch broad, slightly serrate, on pretty long footstalks: the stems slender, a foot and half high; with small, narrow, entire, sessile leaves: the flowers in panicled bunches, clustered together, forming a thick erect spike, appearing in August and September. The narrow-leaved, which has the stalk round, smooth, a foot and half high: the leaves narrow-lanceolate, an inch and quarter long, and an eighth of an inch broad, almost entire, sessile: the flowers in small clustered bunches from the axils, to which they sit very close; and the stalk is terminated by a roundish bunch. The Dwarf Golden-rod, which has the lower leaves indented: the stalk seldom more than a foot high, branching out almost from the bottom: the branches terminated by short, clustered, erect spikes: the leaves on the stem and branches very narrow, acute-pointed and entire. The Welch Golden-rod, which has the lower leaves narrow-lanceolate, an inch and half long, and a quarter of an inch broad, smooth, slightly serrate, a little hoary on the under side: the stalk about six inches high, with the same sort of leaves on it, only smaller: the flowers in roundish clustered terminating spikes, much larger than those of the common sort, and appearing five or six weeks earlier in the season.

The second species has the stalks round, smooth, and two feet high; the leaves narrow and rough, with three longitudinal veins, two inches and a half long, and a quarter of an inch broad in the middle, sessile, ending in acute points, and having sometimes a few slight serratures: the flowers in a roundish terminating panicle, the lower spikes of which are reflexed, but those at the top erect and joined very close. These appear in July. It is a native of Canada.

The third has the stems numerous, straight, rigid, from three to four feet and a half high, the thickness of a straw or more at the base, round, slightly streaked, hirsute, clothed from top to bottom at short distances with leaves, which are widish, oblong, pointed, rough, at their upper and lower parts thinly crenate, in the middle serrate, the serratures minutely crenate; those on the upper branches not serrate, but only minutely crenate; they are green on both sides, with a few oblique veins, and are hairy along the nerve and veins at the back, but without hairs every where else: the flowers very many, on the upper branches, in long rod-like spikes, somewhat reflexed, having four, five, or six florets in the ray: they appear in August and September. It is a native of New England, Virginia, and Carolina.

There are several varieties; as the Tallest Golden-rod—the Hairy Golden-rod—the Recurved Golden-rod—the Virginia Golden-rod.

The fourth species has oblique stalks, a foot

and half high, smooth, with a brown bark: the leaves smooth, spear-shaped, entire, three inches long, and three quarters of an inch broad: the flowers come out on branching footstalks on the side of the stalks, are ranged on one side, and have a few small leaves under the flowers, which appear at the end of August. It is a native of North America.

The fifth has smooth erect stalks, a foot and half high: the leaves narrow, smooth, entire, dark green: the flowers in close compact panicles at the top of the stalk; spikes short, clustered: the flowers large, bright yellow, appearing in September. It is a native of North America.

The sixth species has the lower leaves oval, six inches long, and three broad, ending in acute points, serrate, having several strong longitudinal veins on long footstalks which have leafy borders or wings: the stalks a foot and half high, branching out almost from the bottom, garnished with small, spear-shaped, entire leaves: the branches grow erect, are closely furnished with small leaves below, and are terminated by short close spikes of white flowers; or rather, having a yellow disk and a white ray, in close racemes. It is a native of North America, flowering in September.

The seventh has the stalks two feet high: the lower leaves ovate, stiff, smooth and entire, four inches long, and two inches and a half broad, on footstalks four inches in length; those on the upper part of the stalk are spear-shaped, entire, and embrace the stalk half round: the flowers in loose, spreading, terminating panicles; spikes short, clustered, bright yellow, appearing in August. It is a native of New England.

The eighth species has the stalk slender, smooth, a foot and half high: the leaves narrow-spearshaped, two inches long, and half an inch broad, indented on their edges, and ending in acute points: the flowers in a loose terminating panicle, with the spikes closer and thicker towards the top. It is a native of Maryland, flowering in September.

The ninth has the lower leaves four inches long, and almost two broad; their footstalks two inches long, having a membrane or wing on each side: the stalk rises two feet high; they are slender, smooth, and of a light purple colour: the leaves ovate-lanceolate, indented, near two inches long, and three quarters of an inch broad, of a pale green on their under side: the flowers are produced in short bunches from the axils almost the whole length; the lower spikes are an inch long, but the upper ones are almost round: the flowers are of a brimstone colour, and appear late in August. It is a native of Canada.

The tenth species is remarkable for its red stalk, higher than a man, with very smooth and somewhat fleshy leaves, a little rugged at the edge, continuing the whole winter; it flowers very late, so that in the Northern countries the frost commonly prevents them from opening. It is a native of North America.

Culture.—These plants are all readily increased by slipping or parting the roots, and planting them out in the autumn or winter soon after their stems decay, or very early in the spring before they begin to shoot; but the former is the better season, in the places where they are to grow: they succeed in almost any soil or situation, and afterwards require only to be kept clean from weeds, and to have the decayed stems cut down when they begin to decay in the autumn. When they have increased considerably in the roots, they should always be slipped as above.

In planting out they require much room, as they spread considerably.

They afford considerable variety and ornament in larger borders and clumps.

SOLOMON'S SEAL. See CONVALLARIA.

SOPEBERRY. See SAPINDUS.

SOPEWORT. See SAPONARIA.

SOPHORA, a genus containing plants of the herbaceous, flowery, perennial, and shrubby exotic kinds.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leafed perianth, short, bell-shaped, gibbous at the base above: mouth five-toothed, oblique, obtuse: the corolla papilionaceous, five-petalled: standard oblong, gradually wider, straight, reflexed at the sides: wings two, oblong, appendicled at the base, length of the standard: keel two-petalled, with the petals conformable to the wings, the lower margins approximating and boat-shaped: the stamina have ten filaments, distinct, parallel, awl-shaped, length of the corolla within the keel: anthers very small, rising: the pistillum is an oblong germ, cylindrical: style size and situation of the stamens: stigma obtuse: the pericarpium is a legume very long, slender, one-celled, knobbed at the seeds: the seeds very many, roundish.

The species cultivated are: 1. *S. tetraptera*, Wing-podded Sophora; 2. *S. microphylla*, Small-leaved Shrubby Sophora; 3. *S. alopecuroides*, Fox-tail Sophora; 4. *S. australis*, Blue Sophora; 5. *S. tinctoria*, Dyer's Sophora; 6. *S. alba*, White Sophora; 7. *S. tomentosa*, Downy Sophora; 8. *S. occidentalis*, Occidental Sophora; 9. *S. japonica*, Shining-leaved Sophora; 10. *S. capensis*, Vetch-leaved Sophora; 11. *S. aurea*, Golden-flowered Sophora; 12. *S. myrtillifolia*, Round-leaved Sophora.

The first is a magnificent tree, displaying its pendulous branches of large golden flowers in May and June. It is a native of New Zealand.

The second species is a smooth tree, with small leaves almost wedge-shaped; the flowers large and yellow; the legume compressed, torulose, flat at the back and belly, keeled at the sides with longitudinal membranes. It is a native of New Zealand, flowering in May and June.

The third has a perennial creeping root, from which arise several erect stalks from three to four feet high: the leaves unequally pinnate: the flowers pale blue and small, in long axillary spikes standing erect close to the stalk: they smell sweet. It is a native of the Levant, flowering in July and August.

The fourth species has a herbaceous stem, most commonly decumbent: the leaves cuneate-oblong, smooth, yellowish green; the stipules ensiform, longer than the shortest petiole; the flowers are blue. It is a native of Carolina, flowering in June and July.

The fifth has a perennial root, from which arise several stalks about a foot and half high, sending out from the bottom a great number of small branches: the flowers come out towards the end of the branches in short spikes; are yellow and appear in July. It is a native of Barbadoes and Virginia.

The sixth species has the stem even, high, dark purple: the leaves, like those of Laburnum, even, elliptic, smooth on both sides, an inch and half long: the stipules scarcely any: the raceme a foot long, pendulous: the flowers white, the size of those of Laburnum. It flowers in June, and is a native of Virginia and Carolina.

The seventh species has a downy stem, six or seven feet high: the leaves unequally pinnate, composed of five or six pairs of leaflets: the flowers in short loose axillary spikes, large and yellow, not unlike those of Spanish Broom, void of scent: the pods larger, woolly, five or six inches long, having four or five large swellings, in each of which is a roundish brown seed as big as a pea. It is a native of Ceylon.

The eighth is a shrub, with a round hoary-pubescent stem, and round spreading subtomentose branches, six or seven feet in height: the leaves on alternate, long, spreading, round, hoary petioles, thickened at the base: leaflets opposite, mostly six-paired with an odd one, entire, flat, hoary, white tomentose beneath, on short round petioles: the flowers in a sort of spike: the peduncle terminating, erect, a foot long, simple, round, many-flowered: flowers close, biggish, peduncled, yellow. It is a native of the West-Indies; flowers there in May and June.

The ninth species has the branches round, even, purplish: the leaves alternate, unequally pinnate: leaflets subopposite, on very short petioles, oblong, blunt with a point, quite entire, glaucous beneath, smooth, spreading an inch long: the flowers on panicled racemed branchlets, of a white colour. It is a native of Japan.

The tenth is a tender pubescent shrub, when more advanced in its wild state naked: the leaves alternate, unequally pinnate: leaflets twenty-three, narrow-lanceolate, equal, quite entire, shining above, subtomentose beneath: the raceme terminating, composed of white recurved flowers. It is a native of the Cape.

The eleventh species is a shrub the height of a man: the root has the smell and taste of liquorice: the stem upright, round, tubercled, gray: branches alternate, spreading, like the stem: the leaves alternate, unequally pinnate, spreading, eight inches long: petioles round on one side, channelled on the other, pubescent: the leaflets from twelve to fifteen pairs, opposite, on short petioles, those of the outmost longer, quite entire, one-nerved, bright green, paler beneath, spreading very much, flat: the stipules linear, acute, pubescent, brownish, erect, permanent: the racemes axillary, solitary, peduncled, spreading, bracted, pubescent, four or five inches long: the flowers alternate, nodding, yellow, eight or nine lines in length, on round pedicels jointed at the top. It is a native of Africa, and flowers there in July.

The twelfth has a shrubby, round, leafy, even stem: the branches almost upright, tomentose, somewhat angular towards their tops: the leaves scattered, on short petioles, ten lines long, and four broad, quite entire, rounded at the end with a reflexed point, grooved above and keeled beneath, coriaceous. On each side of the petiole an awl-shaped tomentose stipule, twice as long as the petiole: the flowers towards the end of the branches from the axils of the leaves, solitary, on peduncles the length of the adjacent leaf, white-tomentose; seldom two-flowered. It is a native of the Cape, flowering from November to January.

Culture.—The first five sorts are hardy, and may be increased by seeds or parting the roots.

The seeds should be sown in the spring in pots of fine mould, and when the plants are come up they should be removed into separate pots, till they have obtained sufficient strength, when they may be planted out where they are to grow.

The roots may likewise, in many of the sorts, be parted at the same season and planted in pots, or where they are to remain.

The first and second sorts may also be raised from cuttings and layers, planted or laid down at the same season. These, when planted against a wall, so as to be protected from frost in winter, succeed very well.

All the other sorts are tender, and require the hot-house or stove. They are increased by sowing the seed in the early spring, in pots filled with fine mellow light mould, and plunged in the hot-bed under glasses, or in the bark-bed. When the plants have advanced a little in growth, they should be removed into separate pots, filled with soft loamy mould, being well watered and replunged in the bark-bed till fresh rooted; being afterwards managed as other exotic stove plants, with but little water. They likewise sometimes succeed by layers and cuttings, treated in the same manner.

The first sorts afford variety in the borders and among potted plants, and the latter in stove collections.

SORB TREE. See SORBUS DOMESTICA.

SORBUS, a genus containing plants of the ornamental tree kind.

It belongs to the class and order *Icosandria Trigynia*, and ranks in the natural order of *Pomaceæ*.

The characters are: that the calyx is a one-leafed perianth, concave-spreading, five-cleft, permanent: the corolla has five petals, roundish, concave, inserted into the calyx: the stamina have twenty awl-shaped filaments, inserted into the calyx: anthers roundish: the pistillum is an inferior germ: styles three, filiform, erect: stigmas headed: the pericarpium is a soft globular berry, umbilicate: the seeds three, somewhat oblong, distinct, cartilaginous.

The species cultivated are: 1. *S. aucuparia*, Mountain Service, Mountain Ash, Quicken Tree, Roan Tree; 2. *S. domestica*, True Service or Sorb; 3. *S. hybrida*, Bastard Service, or Mountain Ash.

The first is an elegant tree, of slow growth; the wood tough and close-grained, not very hard; the bark smooth and gray; the young branches purplish brown: the leaves unequally pinnate: leaflets (five, six, seven or eight pairs) serrate except at the base, smooth above, and nearly so beneath, except a few fine scattered hairs; their under side is also glaucous: they are sessile, lanceolate; the middle ones longest, and the odd one is rather oblong-ovate: the midrib is channelled, and often purple. And, according to Miller, the leaves on the young trees in the spring are hoary on their under side, but about midsummer the hoariness goes off, and those upon the older branches have very little at any season: the flowers are in large, terminating, pubescent corymbs, very much branched: the fruit bright red or scarlet when ripe, nearly round, the size of a large pea, juicy, with an astringency. It is a native of the colder parts of Europe, &c.

The leaves make a pretty variety when mixed with other trees in plantations: it is also handsome when in flower, and in the autumn, when in fruit; but the blackbirds and thrushes are so fond of it, that they devour it before it is well ripe.

The second species is a tree of a middling size, not unlike the first, of very slow growth, not flowering till it arrives at a great age; the wood is very hard: the leaves alternate, composed of from six or seven to nine pairs of opposite, sessile, ovate or oblong, equal leaflets, with a terminating one of the same size; all entire at the base, serrate from about half way to the end, smooth above, downy beneath, but that downiness goes off towards autumn: the flowers in terminating panicles, subcorymbed, tomentose: the fruit pear-shaped, reddish and spotted, extremely austere, and not eatable till it is quite mellowed by frost or time, when it becomes brown and very soft. It is a native of the warmer parts of Europe, flowering in May.

There are varieties in the fruit: as with apple shaped fruit; with pear-shaped fruit; with oval fruit; with turbinated fruit; and with compressed fruit.

The third is a middle-sized tree: the leaves lobed in front, pinnate at the base, serrate, without any stipules, smooth above, white-tomentose beneath: the corymbs terminating, tomentose, many-flowered: the flowers white: the styles three, or sometimes two only: the fruit as in the first, but a little larger.

Culture.—These plants are all capable of being raised from seed, and also by layers; but the first is the best method.

The seeds, when well ripened in the autumn, should be sown on small beds of light fine ground in the nursery, either in drills or over the surface, covering them in to the depth of about an inch. When the plants rise in the following or second spring, they should be kept clear from weeds, and when of a year's growth, be planted out in nursery-rows, to remain till of a proper size for planting out.

The second sort is sometimes sown in large pots and forwarded in a hot-bed, so as to be sooner fit for planting out in nursery-rows.

In the layer method, some of the best trees should be cut down near to the ground while young, by which young shoots will be sent off, which should be laid down in the usual way in the autumn or spring season, where they readily strike root, and become proper for being planted out in nursery-rows in one year. In order to continue any particular variety, this method must constantly be adopted.

In cultivating the second sort for the purpose of fruit, the best method is by grafting or budding upon stocks of any of the sorts raised as above, or upon pear stocks.

These trees in rearing should be trained for standards, each with a single upright stem, in the nursery, till from three to six or eight feet high, when they are proper for any plantation, and may be transplanted as required.

They may be introduced in any large shrubbery or other ornamental plantation, and in those of forest-trees. Some of the domestic Services may also be introduced as fruit-trees in gardens and orchards, principally as standards, but occasionally in espaliers, &c. in both of which they should be planted and managed as apple- and pear-trees, permitting the standards to shoot freely above into full heads; the others being regulated according to their order of training. They will produce plentiful crops of fruit annually, after some time, to gather in autumn. In gathering of which for the table, it is proper to lay some in the fruitery, &c. a little time, to mellow, become soft and tender, in which state it is eatable, and of an agreeable taste and flavour.

SORREL. See RUMEX.

SORREL TREE. See ANDROMEDA and RUMEX.

SOUR GOURD. See ADANSONIA.

SOUR SOP. See ANNONA.

SOUTHERNWOOD. See ARTEMISIA.

SOUTH-SEA TEA. See ILEX.

SOW-BREAD. See CYCLAMEN.

SPANISH BROOM. See SPARTIUM.

SPANISH ELM. See CORDIA.

SPANISH POTATOES. See CONVOLVULUS.

SOUP HERBS, such as are made use of in soups and other culinary preparations. Various sorts of herbaceous vegetables are in estimation for this purpose, a list of which may be useful in assisting the memory in furnishing the garden with the proper sorts; but under the denomination of Soup Herbs, all the sorts of Pot-herbs used occasionally in soups and broths, &c. are included, as well as several sorts used as Salad-herbs.

The principal sorts are: Celery, Endive, Leeks, Lettuce, Spinach, Green and White Beet, Chard Beet, Orach, Borage, Bugloss, Burnet, Chervil, Sorrel, Parsley, Coriander, Pot-Marigold, Thyme, Winter Savory, Summer Savory, Pot or Winter Marjoram, Sweet Marjoram, Spear-Mint, Tarragon, Basil, Love-Apple or Tomatoes.

In all of which, except the Marigold and Love-Apple, the leaves are the only useful parts; but in the Marigold the flowers are the only part used, and in the Love-Apple the fruit. All the sorts, except the last two, (Basil and Love-Apple) are of a hardy temperature, and may be easily raised in the natural ground; and the greater part are biennials and annuals, that require to be raised from seed every year; but the Thyme, Winter Savory, Pot or Winter Marjoram, Sorrel, Mint, Burnet, and Tarragon, are perennials of many years' duration, being raised in some sorts both by seeds and slips, but in others principally by slips; and the Basil and Love-Apple, being tender annuals, require to be raised from seed in a hot-bed. *See the Cultures of the different sorts.*

SOWING OF SEEDS, the practice of putting seeds into the ground; in which different methods are made use of, according to the sorts: as Broad-cast sowing and raking-in, Drill-sowing, Bedding-in sowing, &c.

The first is the most common and expeditious method of sowing, both for many of the principal crops to remain, and for transplantation; and is performed by sowing the seed with a spreading cast evenly all over the surface of the ground, either in one continued plat or divided into beds, which is immediately raked with a large rake to bury all the seeds a due depth in the earth, some requiring to be raked in as light as possible, others half an inch or an inch or more deep, according to their sizes, &c.

In preparing for this method of sowing, the ground is previously dug over in the common way, making the surface level with the spade as the work proceeds, and, according to the nature of the seed, sowing it as soon as possible afterwards.

This sort of sowing should generally be performed in dry weather, particularly the early sowings in winter and spring; but in hot weather, in summer and autumn, it may often be eligible to take advantage of sowing immediately after a shower or moderate rain.

As to the sowing the seed in the Broad-cast way, it is effected occasionally both with an open and locked hand. In the former case, it is performed by delivering the seeds with an open hand, and broad-spreading cast, as practised in sowing corn in the open fields, previously stepping out the ground in breaks, or certain widths, as a guide to sow with the greater regularity; proceeding with the sowing along each space with a regular step and cast, giving the hand a proper sweeping cant forward, fully expanded at the delivery of the seeds, making them spread abroad evenly in every part; and thus proceeding up one space and down another till finished; which method is practised in large kitchen grounds in sowing any considerable space in one continued plat.

But the latter is practised occasionally, both in sowing large continued plats of ground, and narrow beds, &c. but more generally the latter; especially when intended sowing them bed and bed separately, or on narrow borders, and other

small plats of ground, commonly sowing or delivering the seeds with a locked or close hand, discharging them from between the fore-finger and thumb, opening or pinching the thumb more or less, according to the size and nature of the seeds and thickness they require to be sown, giving the hand a sort of jerking turn, or cant forward, at the delivery, to cause the seeds to spread regularly.

As soon as the seeds are sown they should be directly raked in, before the surface of the ground is rendered either too dry by the sun or wind, or made too wet by rain, in a regular and even manner, so as to bury them sufficiently according to their kinds, all large stones, lumpy clods, and rubbish being cleared off; smaller or larger rakes being used, as they may be necessary. See RAKE.

But previous to the raking in the seeds sown on the general surface in one continued space, where the ground is loose, light, and dry, and in a dry season, it is sometimes the practice, after sowing, to tread them in evenly by treading the ground all over lightly and regularly with the feet. It is also sometimes proper to pare up the loose earth of the alleys an inch or two deep, and spread it thinly over the surface. The work of treading in the seeds is performed with the feet nearly close together, taking short regular steps, treading the surface all over, once in a place, with but small spaces between the steppings.

But in extensive market kitchen-gardens, where large tracts of ground are sown at once, instead of raking in the seed, they, for the sake of expedition and cheapness, have light short-tined harrows to draw with men, with which they harrow in the seeds; and sometimes in light dry ground, and a dry surface, they afterwards roll the ground with a light wooden roller, to close and smooth the surface over the seeds more effectually, performing it when the surface is a little dried so as not to adhere to the roller. And in large garden-farms in fields, where they commonly plough and harrow the ground for the reception of the seeds, they practise only the Broad-cast sowing in continued tracts for almost all their esculent seeds, except peas, beans, and kidney-beans; the ground being prepared by ploughing, and afterwards rough-harrowed, to smooth the surface moderately, the seeds being then sown in the spreading open-handed manner, and harrowed in either with a light short-toothed horse-harrow, or by men for particular crops; when, if very dry weather, they roll the surface afterwards with a wooden roller, drawn by horses, &c. to smooth the surface.

The second method of sowing is necessary for many sorts of seeds, both esculent, flower, tree and shrub kinds in the nursery, both for the plants to remain where sown, and for transplantation, which is performed in drills from a quarter or half an inch, to two or three inches deep, according to the sizes and sorts of seeds, which being sown evenly along the bottom of the drill, the earth is drawn evenly over them with a hoe or rake, the depths as above, and the surface lightly raked smooth. This mode is always proper for large kinds of seeds, such as peas, beans, kidney-beans, and many large kinds of tree and shrub seeds, nuts, and berries; it being not only the most ready method of committing those large seeds to the ground the proper depth, but, by being in rows at a distance, best suits the nature of the growth of these sorts of plants and their methods of culture. Many kinds of small seeds are also the most conveniently sown and cultivated in drills; such as several of the kitchen-garden plants, as parsley, chervil, coriander, all the sorts of small-salading, and sometimes spinach, beet, &c. also some of the aromatics, when designed as edgings; and also occasionally in rows in beds, both to remain and for transplanting, such as thyme, savory, hyssop, &c. likewise many sorts of flower-seeds for transplantation, and sometimes to remain. It is performed by drawing the drills with a common drawing-hoe, larger or smaller, in proportion to the sorts of seeds to be sown, setting a line as a guide to draw the drills straight by, which are drawn of different depths, as the sorts and sizes of the seeds may require, and at proportionable distances, from three or four inches to as many feet, according to the nature of the plants. Sometimes, when very small drills are required for fine or small seeds, to be sown in a bed, border, or hot-bed, it is done with the end of the finger, or with the end of a small flat stick.

The seeds should in general be sown and covered in directly, if the ground is dry and in good order; but if the soil is wet, especially at an early season, it may be proper to suffer the drills to lie open exposed to the sun and air an hour or two, or more, to dry a little, particularly for tender seeds in early sowings, in the full ground. The sowing in the drills is performed for the most part with a locked or close hand, discharging the seeds from between the fore-finger and thumb, scattering them evenly along the bottom of the drill, some sorts requiring to be sown thinly just along the middle, such as in the angular drills drawn corner-ways of the hoe, for peas and many other larger seeds; also sometimes for smaller seeds when intended for edgings; but in the shallow flat-bottomed drills, it is generally intended for the seeds to be scattered evenly the whole width of the drill, thicker or thinner, according to the nature of growth of their respective plants.

The work of covering or turning in the earth in the drills over the seeds, may be performed occasionally both with the rake, hoe, and feet; but the rake or hoe is the most proper for general practice for all smaller seeds, drawing the earth evenly into the drills a regular depth fully to the depth of the drill, whether deep or shallow: however, peas, beans, kidney-beans, and such-like larger seeds in large drills at wide distances, are often covered in with the feet, by slipping them lightly along each side of the drill alternately, turning the earth evenly in over the seeds; the surface being then lightly trimmed along with the rake, to smooth it and clear off large stones, &c.

In the last method, the ground being dug and formed into four or five feet-wide beds, with alleys a spade's width or more between bed and bed, and the earth drawn off the top of the bed with a rake or spade half an inch or an inch or more deep into the alley, the seed is sown all over the surface of the bed; which done, the earth in the alley is immediately, either with a rake, drawn spreadingly upon the bed again over the seeds the same depth, or spread over with a spade, and the surface raked smooth and even in a similar manner.

It is often practised in the nurseries, especially in sowing some large sorts of seeds, as well as others, but not very frequently in kitchen-gardens. It is not so expeditious as the Broad-cast sowing, but is very proper for many sorts of small seeds, and many sorts of the tree and shrub kind, being a very regular method of sowing so as to cover all the seeds an equal depth, and is performed two or three different ways; such as by the rake, by the spade, and by sifting.

It is also sometimes performed with the rake and spade together, particularly when intended to sow any large seeds a good depth, using the rake to shove or rake the earth from off the bed into the alleys; or if it cannot be conveniently performed with the rake a proper depth, it is effected with the spade, trimming or paring the earth evenly off the surface into the alleys; then sowing the seeds all over the surface; and if they are of the larger berry, nut, or stone kind, or any other large seed, previous to covering them, pressing or patting them all evenly down into the earth with the back of the spade; and then, either with the rake or spade, spreading the earth out of the alleys evenly over them; though if it is a deep covering, especially when taken off with the spade, it is most eligible to use the same implement in returning it, being careful to spread it evenly, to cover the seeds all equally a proper depth, smoothing the surface with the rake.

Another method sometimes practised with large seeds is, that when the ground is laid out in beds unraked, the seed is sown on the surface, and with a rake stricken a little into the earth, then with the spade paring the alley, and casting the earth evenly over the bed, half an inch, or an inch or more deep, as may be required, raking the surface even. This is also sometimes practised in wettish ground, at an early season, when it does not readily admit of treading or raking. And by deepening the alleys, and raising the beds, it drains the moisture from the surface.

The method by sifting is sometimes practised for several small or light seeds of a more delicate nature, that require a very light covering of earth when sown; as in order to cover them as shallow as possible, it is done by sifting fine earth over them out of a wire or chip sieve. Before the seed is sown, the surface of the bed, &c. is raked fine; then the earth thinly shoved off the surface of the bed with the back of the rake into the alley, making the surface as smooth as possible, and then sowing the seed, smoothing it down lightly with the spade, and sifting the earth in the alley evenly over it, to a suitable thickness, as half a quarter or a quarter of an inch deep; or sometimes the surface is only raked as smooth as possible, without drawing off the earth, or sometimes lightly smoothed with the back of the spade, then sowing the seed, and letting some loose fine earth from the alley, or some brought for the purpose, be sifted thinly over it.

The modes of sowing the different sorts of seed crops are more fully explained under their respective heads.

SPADE, an useful garden implement, used for digging and preparing the soil for the reception of all sorts of seeds and plants.

There are several sorts and sizes of spades occasionally employed, though the common large digging spade is, in most places, almost commonly used for all kinds of digging and spade-work, which, however, in many instances, cannot be so conveniently used as a middling or small spade; it is therefore eligible for every garden to be furnished with three different sizes of spades, to suit every department of gardening the more commodiously; such as the common Large digging Spade, for all common digging and spade-work; a Middling, and a Small Spade for digging particular narrow compartments, and between small plants closely placed in beds and borders, &c.

The first sort is usually from fourteen to fifteen inches long in the plate, and nine broad, narrowing gradually half an inch or an inch less at the bottom.

The second sort should be about a foot long in the plate, and seven or eight inches broad.

The Small Spade, which is about eight or nine inches long in the plate, and five wide, is convenient in pointing up or slight digging, and in fresh loosening the surface between close-placed small plants, in beds and borders, &c. where neither of the two former spades can be readily introduced: it is also useful in planting and potting many sorts of small plants, taking up small roots, and other light purposes.

And a very Small narrow Spade, having the plate about seven inches long, by three and a half or four wide, is also very useful in small compartments of beds, borders, &c. containing some particular close-placed, small plants of flowers, and others, both in occasionally slightly digging, or loosening the earth between them with greater care and effect, than a larger sized spade; also sometimes in similar compartments in occasionally trimming round the bottom part of some straggling fibrous-rooted plants; and it is also often useful in taking up and transplanting small plants, and taking off root off-sets and slips, in particular sorts, in which a larger spade would not be so convenient. And a Semicircular, or Scooped Spade, is another sort, of a smallish size, having the plate made hollow like a scooped garden-trowel, which is very useful in taking up small plants with balls of earth, to preserve the ball more firmly about the roots.

Proper Garden Spades have the plate wholly of iron, not above a quarter of an inch thick upward, growing gradually thinner from the middle downward; the tree or handle being generally of ash, about two feet long, and an inch and half thick, with a firm open handle at top, formed out of the solid wood, just big enough to admit of taking ready hold.

SPARTIUM, a genus containing plants of the deciduous and evergreen kinds.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leafed perianth, cordate-tubular: at the upper edge very short, below towards the tip marked with five toothlets, coloured, small: the corolla papilionaceous, five-celled: standard obcordate, the whole reflexed, very large: wings ovate, oblong, shorter than the standard, annexed to the filaments: keel two-petalled, lanceolate, oblong, longer than the wings, (the carinal margin connected by hairs,) inserted into the filaments: the stamina have ten connate filaments, adhering to the germ, unequal, gradually longer; the uppermost very short; the lower nine-cleft: anthers oblongish: the pistillum is an oblong germ, hirsute: style awl-shaped, rising: stigma growing to the upper side of the top, oblong, villose: the pericarpium is a cylindric legume, long, obtuse, one-celled, two-valved: the seeds many, globe-kidney form.

The species cultivated are: 1. *S. scoparium*, Common Broom; 2. *S. junceum*, Spanish Broom; 3. *S. radiatum*, Starry Broom; 4. *S. monospermum*, White-flowered Single-seeded Broom; 5. *S. sphærocarpum*, Yellow-flowered Single-seeded Broom; 6. *S. Scorpius*, Scorpion Broom; 7. *S. angulatum*, Angular-branched Broom; 8. *S. spinosum*, Prickly Broom.

The first grows from three to six feet high or more, very much branched; the branches upright, rushy, evergreen, angular, flexible, leafy, smooth except the very young ones which are downy; the leaves ternate, small, ovate, acute, downy and edged with soft hairs bending inwards; the leaf-stalks are also slightly hairy, and flattened: the flowers axillary, solitary or two together, rarely three, nodding, on round smooth peduncles, furnished on each side with a very minute stipule, of a fine yellow colour. It is a native of Europe, flowering in May and June.

There are several varieties, some of which merit a place among flowering shrubs; as that with a purple calyx, and the flowers strongly tinged with orange, as well as that which is very hoary.

The second species has the branches smooth, flexible, eight or ten feet high; the lower ones have small smooth leaves, at the end of the shoots of the same year; the flowers are disposed in a loose spike, are large, yellow, have a strong agreeable odour, appear in July, and in cool seasons continue in succession till September. It is a native of all the Southern countries of Europe.

There is a variety with double flowers.

The third has low stems, with opposite four-cornered branches: the leaves opposite, subsessile: leaflets sessile, thin, subpubescent: the petioles extremely short, but permanent, three-cornered, gibbous, very blunt, thicker than the branchlet to be supported: the flowers terminating, in threes, sessile. In its natural state it is a low shrub; when cultivated it becomes much larger, though rarely exceeding two feet and a half in height, but the branches spread very much and form a large bush; they are angular and pliable, and always come out by pairs opposite: the leaves narrow and awl-shaped, placed round the stalk, spreading out like the points of a star: the flowers in small spikes at the end of the branches, bright yellow, but not

more than half the size of the second sort, and without scent. It flowers in June, and is a native of Italy.

The fourth species has a thick stalk, covered with a rugged bark when old; it rises eight or nine feet high, sending out many slender rush-like branches of a silvery colour, almost taper, which terminate in very slender bending ends; these have a few narrow spear-shaped leaves on the lower branches: the flowers are produced in very short spikes or clusters on the side of the branches; are small and white. It is a native of Spain and Portugal, flowering in June and July.

The fifth has an upright stem: the branches numerous, slender, round, smooth, slightly striated, having a few tubercles scattered over them, below leafless: the leaves on the younger branchlets small, lanceolate, deciduous, silky, with very short hairs pressed close: the flowers small, racemed, each on a very short pedicel. It is a native of the South of Europe and Barbary, flowering in June and July.

The sixth species is a shrub wholly covered with alternate spines, on which the flowers are placed; this renders it quite inaccessible: the branches and leaves are striated and ash-coloured, and the latter are a little villose: the flowers are yellow and rather large. It is a native of the South of Europe and Barbary, flowering in March and April.

The seventh has the stalks and branches slender, having a few trifoliate and single leaves towards the bottom: the branches have six angles or furrows: the flowers small, of a pale yellow colour, produced in loose spikes at the ends of the branches, rarely producing seeds in this climate. It is a native of the Levant.

The eighth species has stalks five or six feet high, sending out many flexible branches, armed with long spines: flowers terminating in clusters, each upon a long pedicel: corolla bright yellow, appearing in June. It is a native of Italy and Spain.

Culture.—The three first sorts are hardy, but the others more tender, especially in their young growth.

They are all capable of being raised from seeds, and the double-blossomed sorts by layers and cuttings. The seeds should be sown in the early spring, as about April; the hardy sorts in beds of common earth, either in drills or by bedding in to the depth of an inch: but in the tender sorts in pots or beds hooped over to protect them in frosty weather. In the following spring they should be removed into nursery-rows or larger pots, according to the kinds, shortening their tap-roots, and setting them out in rows two feet apart, at the distance of one in the rows, to remain two or three years, when they may be planted out in the shrubbery, or other places: the tender sorts in pots being removed to the greenhouse or garden for protection in winter, being managed as the hardy sorts of plants of this kind.

The layers should be laid down in the autumn or spring, and the cuttings may be planted out in the spring or summer, some in the open ground, and others in pots plunged in the hot-bed to promote their striking root. They may be managed afterwards as the other sorts.

This is the only certain mode of preserving the varieties.

The hardy sorts are very ornamental in the borders, clumps, and other parts, and the tender kinds in greenhouse collections, and among other more hardy potted plants.

SPAWN, the progeny or offspring of plants or other vegetables; but it is mostly applied to such small offsets, suckers, and sprouts as rise numerously from the roots, &c. of certain plants, serving for the purpose of increase, which, as being parts similar to the whole plant, when separated from the parent vegetable and planted out, readily grow, and commence proper plants, and thereby renew or increase their respective kinds with great facility and abundance.

In a general acceptation, it is, however, more peculiarly applied to the progeny of mushrooms, being an offspring from the root of those fungi, consisting of minute white parts, shooting and running in the earth or dung, like small white thready fibres, assuming the appearance of slender white strings, which are productive of numerous minute white knobs, appearing at first the size of small pin-heads, the whole smelling strong of the mushroom; and those little knobs being infant plants, they gradually increase in size to proper mushrooms, which are quick of growth, and of very short duration; but the same spawn running in the earth, &c. furnishes a plentiful supply of mushrooms from the bottom in regular succession for a considerable time, sometimes several months. See AGARICUS.

It may be procured at all seasons of the year, but more plentifully towards the end of summer and in autumn, from the places of its growth; such as old mushroom beds, old horse-dung hot-beds, and horse-dunghills that are moderately dry, and which have remained undisturbed several months; also sometimes in old compost heaps, consisting chiefly of horse-dung; in all of which the spawny substance discovers itself in dry lumps of dung and earth, which lumps should be taken up entire: likewise in stable-yards, where any quantity of horse-dung has lain dry

and undisturbed any considerable time, lumps of spawn are often obtained. It is also found in fine perfection in the horse-rides belonging to great inns, livery-stables, and horse-dealers, especially on the sides next the walls: likewise in horse-mill tracks, where horses are constantly employed in working; also in kitchen-gardens, where any piece of ground has been dunged in the spring, with new, or but moderately-rotted stable-dung, or old dry hot-bed dung, &c.

And sometimes it is produced naturally all over the surface of an old cucumber or melon hot-bed, both in the dung and earth, in autumn or winter, where the frame and lights have been continued over the bed; and where the earth of the bed is of a loamy nature, the spawn is often remarkably fine and strong; for in this kind of earth, of a moderately-light quality, it is generally of a superior quality, and very productive; so as sometimes, in such old beds where the frames and glasses remain, and the surface of the bed is covered thickly with dry straw, litter, or hay, under the glasses, to produce a full crop of good mushrooms towards the spring. See AGARICUS.

Mushroom spawn is also obtained in meadows and pastures towards the end of summer and in autumn, before the rain and cold commences, as in the months of August and September, when the mushrooms rise naturally, serving as a direction to the place where to find it; but that found in the other places is mostly the best.

It is necessary to observe, that there is also a fruitful and barren sort of mushroom spawn; the former is distinguished by the substance of the fibry or stringy white shoots, &c. and mushroom-like smell, as before observed; but in the latter sort, the thready fibres are far more abundant, fine, and downy, often appearing like a fine white down, and, being of no substance, produce only a flash of small white fungi destitute of the fleshy part, and which, by the mushroom-men, is commonly called White-cup.

Methods are sometimes practised to obtain mushroom spawn more abundantly by art, by the effects of horse-dung, both in hot-beds and in compost heaps; sometimes, in the former case, by planting small pieces of spawn, or spawny earth, along the top edge of the later cucumber hot-beds in summer, or in the sides of any horse-dung heaps, having a little warmth remaining; so that the moderate heat of the dung in the bed or heap may set the spawn a-running, so as sometimes to produce a few mushrooms in autumn, and increase it considerably for future use in spawning proper mushroom beds: and in the second case, by a compost of dung and loamy earth together; procuring in spring, or early in summer, a quantity of fresh horse-dung, consisting of plenty of short stuff, and a due proportion of long; and casting the whole into a heap to ferment a fortnight or a month, that the rank burning vapour may pass away; then having some loamy earth, or other good substantial mould, or any spawny soil from old beds, form the dung into a long narrow ridge, mixing some of the earth occasionally towards the outside; and in a fortnight or three weeks, when the heat becomes quite moderate, covering the whole with dry long litter to defend it from the wet, permitting the whole to remain a considerable time, when good spawn will often be produced.

In collecting it from any of these places, the lumps of dung and earth in which it appears should be taken up as entire as possible, put in a basket, and carried into some dry shed, or other place, till wanted, or it may be immediately used.

SPEARAGE. See ASPARAGUS.

SPEAR-KING'S. See ASPHODELUS.

SPEARMINT. See MENTHA.

SPERAGE. See ASPARAGUS.

SPERMACOCE, a genus containing plants of the herbaceous, annual, and shrubby kinds.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Stellatæ*.

The characters are: that the calyx is a small four-toothed perianth, superior, permanent: the corolla one-petalled, funnel-shaped: tube cylindrical, slender, longer than the calyx: border four-parted, from spreading reflexed, obtuse: the stamina have four awl-shaped filaments, shorter than the corolla, or standing out: anthers simple: the pistillum is a roundish germ, compressed, inferior: style simple, but cloven above: stigmas obtuse: the pericarpium has two capsules, connate, oblong, gibbous on one side, flat on the other, obtuse; each two-horned: the seeds solitary, roundish.

The species cultivated are: 1. *S. tenuior*, Slender Button-weed; 2. *S. verticillata*, Whorl-flowered Button-weed.

The first grows to the height of two feet and a half: the stalks are stiff, a little angular, and covered with a brown bark; the branches come out by pairs: there are two leaves at each joint placed opposite, two inches long, and almost a quarter of an inch broad; between these come out three or four smaller leaves, which stand in whorls round the stalks; they are smooth, and have one strong nerve or rib in the middle: the flowers grow in slender whorls toward the top of the stalks; are small, white, and sessile,

having a whorl of leaves close under them. It is a native of Carolina and the West Indies, flowering in June.

The second species has a shrubby stem, three or four feet high, sending out a few slender branches, with narrow leaves on them, not so long as those on the first sort; they are smooth, of a light green, and stand in a kind of whorl round the stems, two being larger than the others in each whorl: the flowers grow in thick globular whorls towards the top, and one terminates the stem; they are small and very white. It is a native of Jamaica and Africa, flowering here from June to August.

Culture.—These plants are increased by sowing the seeds on a moderate hot-bed early in the spring, or in pots to be plunged in it: when the plants have attained some growth, they should be removed into separate pots filled with good friable mould, replunging them in the bed.

They should afterwards be managed as other plants of the exotic stove kind.

They afford variety in stove collections.

SPINACIA, a genus containing a plant of the annual culinary kind.

It belongs to the class and order *Dioecia Pentandria*, and ranks in the natural order of *Holoraceæ*.

The characters are: that in the male the calyx is a five-parted perianth: segments concave, oblong, obtuse: there is no corolla: the stamina have five capillary filaments, longer than the calyx: anthers oblong, twin:—Female, the calyx is a one-leafed perianth, four-cleft, acute, with two opposite segments very small, permanent: there is no corolla: the pistillum is a round compressed germ: styles four, capillary: stigmas simple: there is no pericarpium: calyx unites and hardens: the seed one, roundish, covered by the calyx.

The species is *S. oleracea*, Garden Spinach.

It has an annual root: the leaves sagittate: the stem hollow, branching, herbaceous, about two feet high: the male flowers are herbaceous, in long spikes; they abound in pollen, which, when ripe, flies out when the plants are shaken, and spreads all round; after which the plants soon decay: the female flowers, which are on a separate plant, sit in clusters close to the stalks at every joint; they are small, herbaceous, and are succeeded by roundish seeds, which in the prickly variety are armed with short acute spines. Its native place is not known.

There are varieties of this, which differ in the size and shape of the leaves, and the more or less prickliness of the seeds;—as the Triangular with prickly seeds: the Round with smooth seeds, which has ovate thick leaves, not angular at their base; both stalks and leaves are much more fleshy and succulent; and the seeds are smooth without any spines. Of this also there are two or three subvarieties, differing in the shape, thickness, and size of their leaves.

Culture.—In these plants it is effected only by seed, by sowing it every year in spring and autumn; the former furnishing the main spring and summer crops; and the latter the winter, and for early spring use.

The Prickly sort is the best for winter crops, and the Round for the summer ones.

It should be sown at several intervals of time, from January till August, as every month, three weeks, or fortnight, according to the earliness or advanced period of the season, so as to obtain a regular succession most part of the year.

The general spring crop should be sown in March, and the general winter crop about the beginning of August.

In the spring sowings, as the crops in the very early sowings in January run soon to seed, a moderate quantity should only be sown.

But in the autumn sowings, as the plants do not run the same year, good full crops, to stand for winter and early spring use, should be put in.

It succeeds in any common soil of the kitchen-garden; but the richer in dung the better; always choosing an open situation, not too near low spreading trees, &c., as it never succeeds in close or shady places, in which it is always drawn up weak, and soon runs to seed, without attaining perfection: a warm border may be proper for the early crops; but for the main crops in general, the open quarters are the most suitable, though a broad warm-lying border may also be proper for some part of the later sown winter-crops occasionally, for the purpose of having the advantage of a little shelter of the fence, and benefit of the sun during the winter season; and fresh seed should be procured for each sowing; as this will be found of great importance in the free growth of the plants: for the autumn sowings of the winter crops, it is of advantage to procure new seed of the same year.

After the ground has been dug, the seed may either be sown broad-cast, and raked in, or in shallow drills a foot asunder; though broad-cast is the most expeditious, and probably the most proper method for the growth of the crops, in the product of large full leaves; sowing it all over the surface moderately thin, either in one continued plat, and trodden down evenly, if light ground, and raked in with a large rake or light harrow; or the ground may be divided into four- or five-feet-wide beds, with foot-wide alleys between; especially for the early and winter

crops in moist ground; the seeds being sown as above, raking them in evenly: drill-sowing may also be occasionally practised, drawing the drills with a hoe flatways, near an inch deep, and ten or twelve inches asunder, scattering the seeds thinly along them, raking the earth over, full half an inch deep; which mode is very proper in sowing between other crops, as between wide rows of beans, peas, cabbages, &c. as it admits of hoeing up the weeds between the rows with facility; and if sown thin, and the plants be thinned properly, they grow large and fine, and the produce is very conveniently gathered. It may likewise be sown in wide drills alone, about a foot distance for a distinct full crop: or in rows two feet asunder, to admit of intercropping in the intervals with rows of cabbages, beans, and other things occasionally.

In these sowings the seeds should be scattered moderately thin, and the plants be thinned out to three inches distance at least, being directly raked regularly in: and when sown broad-cast all over the surface, if in light loose land, and a dry warm season in the advanced part of spring, or in the summer and autumn, it may be proper first to tread the seed evenly down, then raking it in effectually with a large rake.

The seeds mostly come up in a fortnight; or perhaps, if sown very early in spring, three weeks or a month.

In respect to the after-culture of the crops, when the plants have three or four leaves an inch broad they should be thinned and cleared from weeds, either by hoe or hand; but the former is the most eligible, especially for the broad-cast-sown crops; choosing dry weather, and cutting out the plants to three or four inches distance, together with all the weeds in every part; but the above distance is scarcely sufficient, unless intended to begin thinning out the plants for use while young: in other cases it is advisable to hoe them out six or eight inches asunder, especially the spring and summer crops of the Round Spinach, which, having proper room, will grow very large, and spread its broad leaves widely, and does not run to seed so soon as if left close. When the spring- and summer-sown crops are left too close, they are apt to draw up weak, and soon go to seed. The winter crops of Triangular or Prickly Spinach, when thinned out finally to three or four inches distance, will be sufficient.

These crops are often sown in spring with other crops, for the sake of cropping the ground to the best advantage; but it is best alone.

When the plants have leaves two or three inches broad, they may be gathered.

The method of which is, either by cutting up with a knife, wholly to the bottom, or cleaning out by the root if the crop wants thinning; or only cropping the large outer leaves; the root and heart, remaining, shoot out again. With the spring crops, when the plants want thinning, they may be cut up wholly to the root, thinning them out where thickest in a gradual manner, so as to leave the standing plants at least six or eight inches distant to grow to perfection, which, when beginning to shoot for seed, may also be cut up wholly to the bottom: and in the winter-crops, if the plants stand too close at first, some may be thinned out quite to the bottom, afterwards the larger outer leaves must only be cropped in the winter, and early part of the spring; but when the spring is more advanced, and the plants grown large and require thinning, or when they begin to run to seed, cutting them up to the bottom in a thinning order.

Some of the best of the different sorts of plants should be left in the spring to stand for seed, which should be collected when well ripened.

SPIRÆA, a genus containing plants of the shrubby and herbaceous kinds.

It belongs to the class and order *Icosandria Pentagynia*, and ranks in the natural order of *Pomaceæ*.

The characters are: that the calyx is a one-leafed five-cleft perianth, flat at the base, with acute segments; permanent: the corolla has five petals, inserted into the calyx, oblong-rounded: the stamina have more than twenty filaments, filiform, shorter than the corolla, inserted into the calyx: anthers roundish: the pistillum has five or more germs: styles as many, filiform, length of the stamens: stigmas headed: the pericarpium is an oblong capsule, acuminate, compressed, two-valved: the seeds few, acuminate, small, fastened to the internal suture.

The species cultivated are: 1. *S. salicifolia*, Willow-leaved Spiræa; 2. *S. tomentosa*, Scarlet Spiræa; 3. *S. hypericifolia*, Hypericum-leaved Spiræa; 4. *S. argentea*, Silvery-leaved Spiræa; 5. *S. chamædrifolia*, Germander-leaved Spiræa; 6. *S. crenata*, Hawthorn-leaved Spiræa; 7. *S. triloba*, Three-lobe-leaved Spiræa; 8. *S. opulifolia*, Currant-leaved Spiræa; 9. *S. sorbifolia*, Service-leaved Spiræa; 10. *S. Aruncus*, Goat's-beard Spiræa; 11. *S. filipendula*, Common Dropwort; 12. *S. ulmaria*, Common Meadow Sweet; 13. *S. trifoliata*, Three-leaved Spiræa.

The first has the stalks very taper, and rough towards the top, and covered with a reddish bark: the leaves about three inches long, and an inch broad in the middle, bluntly serrate,

Painted by Syd. Edwards. London Published April 1.1806 by G. Kearsley Fleet Street. Engraved by F. Sansom

1 *Spiræa lobata*
Lobe leaved Meadow Sweet

2 *Sisyrinchium iridioides.*
Iris-leaved Sisyrinchium.

and of a bright green colour. In rich moist ground the stalks rise five or six feet high, but in moderate land from three to four; as their whole height is one year's growth from the root: they are terminated by spikes of pale red or flesh-coloured flowers. It flowers in June and July; and in moist seasons there are frequently young shoots from the root which flower in autumn. It is a native of Siberia.

There are several varieties: as the Flesh-coloured Willow-leaved, the Alpine Willow-leaved, the Panicled Willow-leaved, and the Broad Willow-leaved Spiræa.

The second species has the stalks slender, and branching out near the ground, with a purple bark covered with a gray mealy down: the leaves smaller than those of the first, downy and veined on their under side, but of a bright green above: the branches terminated by a thick raceme of flowers, branched towards the bottom into small spikes: the flowers very small, of a beautiful red colour, appearing in July, August, and September. It is a native of Pensylvania.

The third rises with several slender shrubby stalks five or six feet high, covered with a dark brown bark, sending out small side branches the whole length: the leaves small, wedge-shaped, having many punctures on their surface: the flowers in small sessile umbels, each on a long slender pedicel, and white: they appear in May and June; and as the flowers are produced almost the whole length of the branches, it makes a good appearance during the time of flowering. It is a native of Italy and America.

The fourth species has striated erect branches, with short branchlets: the leaves alternate, petioled, silky-tomentose on both sides: the racemes longer than the branchlets: the flowers very small, with villose germs. It is a native of New Granada.

The fifth has abundant shoots, seldom two ells high, the thickness of the finger, wand-like, branched: the wood brittle: the bark of the shoots yellowish-brown, with prominent dots scattered over it: the branches alternate, commonly angular, with a testaceous bark somewhat striated, and in the younger branches covered with a tender ash-coloured epidermis, which falls off; the annual shoots are grooved and pubescent: the leaves alternate, softish, pubescent with prostrate hairs, quite entire at the base, but commonly gash-serrate from the middle to the end, where they are sharp: corymbs at the top of the stems frequent, many-flowered, terminating the annual alternate shoots: in gardens and in moist shady places these corymbs are more elongated; but in a ruder soil most of the peduncles are clustered at the top like an umbel: the flowers biggish, white, having a weak virose smell, and fugacious. It is a native of Siberia, &c.

It varies very much, with larger or smaller leaves, more or less cut, but more commonly quite entire and ovate-acute.

The sixth species has several stems, scarcely two ells high, very much branched from the bottom: the branches rod-like, round, with a testaceous bark cloven longitudinally: the leaves on the younger branches and annual shoots alternate, attended with smaller ones in little bundles, hoary or glaucous, three-nerved, hardish, varying in form and size; on the luxuriant shoots or branches sometimes ovate-acute, widish, serrulate from the tip beyond the middle; but commonly oblong, bluntish, crenulate, or serrulate towards the tip, or more commonly quite entire: the corymbs at the ends of the annual twigs, very abundant, disposed along the branches on one side, in hemispherical clusters: the flowers smallish, white, odorous. It is a native of Spain, &c., flowering here in April and May.

The seventh has numerous stems, scarcely thicker than a swan's quill, very much branched, upright, with a gray bark more or less pale, and somewhat angular, with sharp streaks running down from the branches: the branches and branchlets alternate, those of the last year very smooth and yellow, leafy, and terminated by an umbel: the leaves alternate, on very short petioles, smooth, glaucous, wide-ovate, retuse, gash-trilobate: they vary even in the garden, with fewer or more frequent gashes, with the teeth or lobes obtuse or acute, in breadth, &c.: the umbels very frequent at the ends of the annual branches: peduncles often more than thirty, besides a few axillary ones scattered below the umbel: the flowers middle-sized, white. It is an elegant shrub, and a native of Siberia.

The eighth species rises with many shrubby branching stalks, eight or ten feet high in good ground, but generally five or six; they are covered with a loose brown bark which falls off: the leaves about the size and shape of those of the common currant bush, ending in acute points, and serrate on their edges: the flowers are produced in roundish bunches at the end of the branches; are white with some spots of a pale red. It is a native of Canada and Virginia. It is commonly known in the nurseries by the name of Virginian Gelder Rose.

The ninth rises with shrubby stalks like the first, but sends out horizontal branches, which are slender, and covered with a brown bark: the leaves are of a thin texture, and a bright green colour on both sides, slightly and acutely serrate: the flowers in terminating panicles, small

and white. It is a native of Siberia, flowering in August.

The tenth species has a perennial root: the stem annual, from three to four feet high: the leaves doubly pinnate; each having three or four pairs of oblong leaflets terminated by an odd one: they are two inches long, and almost an inch broad, serrate, and ending in acute points: the flowers disposed in long slender spikes, formed into loose terminating panicles; they are small, white, and of two sexes in the same spike. It is a native of Germany, flowering in June and July.

The eleventh has a perennial root, consisting of oval tubers or solid lumps, hanging from the main body by threads, which has given occasion to its common names, Filipendula and Dropwort. These tubers enable the herb to resist drought, and render it very difficult to be eradicated: the stem is erect, from a foot to a foot and half in height, angular, smooth, leafy, a little branched at top: the leaves alternate, interruptedly pinnate, serrate, and jagged, smooth, composed of several pairs of leaflets, all of each set uniform or nearly corresponding in size; the terminating leaflet three-lobed: a pair of roundish united indented stipules at the base of each leaf, embracing the stem: the flowers many in a cymose loose erect panicle, cream-coloured often tipped with red, or red on the outside. It is an elegant plant, which in gardens grows very luxuriant, and has often double flowers. It flowers early in July.

The twelfth has a perennial fibrous root: the stems erect, three or four feet high, angular and furrowed, tinged with red, leafy, branched in the upper part: the leaves interruptedly pinnate: leaflets very unequal in size, sharply serrate, clothed beneath with white down, the end one remarkably large and three-lobed: a pair of rounded serrate stipules are joined to the common leaf-stalk, and clasp the stem: the flowers white, in a large very compound cyme, the side-branches of which rise much above the central one: it perfumes the air with the sweet hawthorn-like scent of its plentiful blossoms from June to August.

There are varieties with double flowers, and with variegated leaves.

The thirteenth has a perennial root: the stalks annual, about a foot high, sending out branches from the side the whole length: the leaves for the most part trifoliate, but sometimes single or in pairs; they are about an inch and half long, and half an inch broad, ending in acute points, sharply serrate, of a bright green above, and pale beneath: the flowers in loose terminating panicles, on slender peduncles. It is a native of North America, flowering in June and July.

Culture.—In all the shrubby sorts, this may be performed by suckers, layers, and cuttings.

The suckers should be taken off in the autumn and planted out where they are to remain, or in nursery-rows, to attain a fuller growth.

The first sort requires to be cleared of these suckers every two years at furthest.

The layers should be put down in the autumn or in the spring, and may be taken off and planted as above, in the autumn or spring following: all the sorts may be raised in this way; but it is most proper for such sorts as do not send off suckers.

The cuttings may be made from the shoots of the preceding summer, and be planted out in a shady border in the early autumn: when they have become well rooted they may be removed and managed as the others: they succeed in this way with more difficulty than in either of the others.

All the herbaceous sorts may be increased by seeds, or parting the roots.

The seed may be sown in the autumn or early in the spring; but the first is the better mode, on a bed of fine mould: when the plants appear they should be kept clear from weeds till the autumn, when they may be planted out where they are to remain, or in the nursery for a year or two.

The roots should be parted in the autumn or spring, when the stems decay, before they shoot out new ones, being planted immediately where they are to grow.

The double-flowered and stiped varieties can only be preserved in this way.

They all afford variety and ornament in the shrubbery and other parts.

SPONDIAS, a genus containing plants of the exotic tree kind.

It belongs to the class and order *Decandria Pentagynia*, and ranks in the natural order of *Terebintaceæ*.

The characters are: that the calyx is a one-leafed perianth, subcampanulate, small, five-cleft, coloured, deciduous: the corolla has five oblong petals, flat, spreading: the stamina have ten awl-shaped filaments, erect, shorter than the corolla, alternately longer: anthers oblong: the pistillum is an ovate germ: styles five, short, distant, erect: stigmas obtuse: the pericarpium is an oblong drupe, large, marked with five dots from the falling of the styles; ten-valved: the seed is an ovate nut, woody, fibrous, five-cornered; five-celled, covered with a fleshy elastic aril.

The species is *S. Mombin*, Purple Hog-Plum, or Spanish Plum.

Its usual height in its native situation is ten or twelve feet, and the stem is as large as a man's leg, sending out branches towards the top covered with a gray bark; these are destitute of leaves for some months; and in the spring, before the leaves appear, many purple flowers come out from the side of the branches; these are succeeded by fruit like plums, having a luscious thin pulp, covering a large fibrous stone: the leaves which come out afterwards are unequally pinnate, with four or five pairs of leaflets, about an inch long and half an inch broad. It is a native of South America.

It is cultivated in its native state by many for the sake of the fruit, which is pretty pleasant.

There is a variety of this fruit called The Leathercoat, from the appearance of its skin.

Culture.—It is increased by sowing the stones of the fruit in pots filled with light mould, plunging them in the bark-bed of the stove; and by planting, cutting, or putting down layers, and managing them in the same way: the plants may be taken off and removed into separate pots when they have stricken good roots, being replunged in the bark-bed.

They require afterwards to be kept constantly in the stove, and to have the same management as other woody exotics of the same nature.

They afford variety in stove collections.

SPONGE-TREE. See MIMOSA.

SPRUCE FIR. See PINUS.

SPURGE. See EUPHORBIA.

SPURGE LAUREL. See DAPHNE.

SPURGE OLIVE. See DAPHNE MEZEREUM.

SQUASH-GOURD. See CUCURBITA.

SQUILL. See SCILLA.

SQUIRTING CUCUMBER. See MOMORDICA.

SPROUTS, the small young shoots or suckers emitted from the sides of the stems and heads, of vegetables, being in many instances a sort of compendium of the plant that produced them; and, when detached and planted, although destitute of roots, often emit fibres, shoot at top to mature growth, and exhibit leaves, flowers, and seed, as the parent plant.

In some herbaceous esculent plants, the young sprouts are excellent eating; as in the cabbage kinds, &c. affording a very profitable after-crop: the sprouts produced from the forward cabbage-stalks in summer and autumn are always larger and finer than the winter and spring sprouts; and sometimes the sprouts produced on the stalks of the early-cut cabbages often also cabbage into tolerable little firm heads towards autumn; in the Sugar-loaf Cabbage particularly, and other forward kinds; producing abundance of fine sprouts in summer, which, being gathered while young and green, constitute some of the most excellent culinary greens of the season; likewise forward Savoys being cut early in autumn, the remaining stalks produce fine large sprouts the same year, fit for use in the early part of winter; later crops of the same plants produce also abundance of small sprouts in the spring; and the Borecole is remarkable for its great production of sprouts towards spring, emitted all along the small stems from the very bottom to top; also Purple Brocoli never fails to produce a secondary crop of excellent sprouts furnished with little tender heads.

In the culture of all the varieties of the cabbage kind, it is proper, therefore, after gathering the main-heads, to leave a quantity of the stalks of the best and more forward crops, of the respective sorts, to produce sprouts; and if, towards autumn or winter, &c., the ground should be wanted for other crops, the stalks may be removed and trenched in by the roots in another place, not in any shady by corner, as often practised, nor placed too close, as the sprouts would prove small and trifling, and be liable to be eaten up by slugs; but in an open situation, in rows a foot asunder, in which method the sprouts will continue their growth in much greater perfection, though probably not in so good as if the stalks had remained undisturbed.

As the stalks of Cauliflowers and Cauliflower-brocoli rarely produce any sprouts, it is needless to leave them standing on the ground.

STANDARD TREES, such as stand singly with an upright stem without being trained to any wall or other support. The term is applicable to all sorts of fruit- and forest-trees, as well as other tree and shrub kinds that have upright stems, and which stand detached erectly without support; though it is more generally understood of such trees as grow with tall erect stems, six or eight feet high or more, before they branch out to form the head; such as the common apple-, pear-, and other fruit-trees in orchards and gardens, and the common forest-trees of the woods and fields. In gardening, they are distinguished into three sorts; as Full Standards, Half Standards, and Dwarf Standards, from their being occasionally trained in all these ways; but forest and tall ornamental trees rarely in any other than Full Standards; though, in the shrub tribe, they are occasionally formed both into Half and Dwarf Standards, according to their natural growths.

Full Standards—These are such trees as are trained with tall, straight, clean stems, six or seven feet high or more, then suffered to branch

out at that height all around to form a head, as in common standard apple- and pear-trees, forest-trees, &c.

Such trees as are designed for full-standards, should be trained accordingly in their minor growth, by trimming off all lower lateral branches gradually as the stem advances in height, to encourage a clean straight growth to the proper height, and promote the aspiring of the top or leading shoot more expeditiously; suffering the leader always to remain entire, especially in all forest-trees; or, if it should happen to fork, taking off the worst, and leaving the straightest shoot to run up, to continue the prolongation of the stem; and having thus run them up with clean stems gradually from six or seven to eight or ten feet or more, especially the deciduous kinds, suffer them to branch out into a full head, and run in height as fast as possible; though in fruit-trees the stem is often topped at six or seven feet height, to force out a set of laterals in that part, to form a regular spreading head of but moderate height, for the greater convenience of gathering the fruit; but for all kinds of forest-tree standards the tops should never be reduced, but the leader be permitted to remain entire to run up in height; as the beauty and worth of such trees consist in their lofty growth.

But in several forest and ornamental standards of the evergreen tribe, the trimming their stems from laterals while young, in this way, must be but sparingly practised; such as the pines, firs, cedars, and several others, which, being of a resinous nature, do not succeed if too closely pruned; besides, when designed for ornamental plantations, the trimming up the under branches would greatly diminish the beauty of their peculiar growth; for the disposition of the branches in most of them, covering the stem in circular rays to the very bottom, is thought additionally ornamental. The lower disorderly stragglers should of course only be taken off.

Most sorts of fruit-trees may be trained for full standards, except vines; though some of them will not ripen their fruit effectually in this way, as peaches, nectarines, apricots, and figs; but, on the other hand, all sorts of apples, pears, plums, and cherries, ripen their fruit freely on standards.

All fruit-trees for this purpose are raised by grafting, &c. on the freest strong-shooting stocks, and trained with straight clean stems, as above, either the stock trained up to that height, and then grafted or budded, the graft or bud branching out forming the head, or the stock grafted, near the ground, and the first shoot from the graft or bud trained up for a stem to the proper height, then suffered to send forth branches; in either method, it is next to be considered whether it be intended the tree shall form a spreading open head, or assume a more erect and aspiring growth; in the former case, if the leading shoot of the graft or bud be topped at six or seven feet from the ground, it will force out lateral shoots at that height, and commence a spreading head open in the middle, suffering, however, the whole afterwards to take their own growth; and in the latter by permitting the leading shoot to remain entire, it will aspire in height, and the whole head will assume a more upright and lofty growth; in both methods the heads will afterwards naturally branch out abundantly, and furnish themselves sufficiently with bearing wood, producing fruit, in some sorts, in two or three years from the grafting and budding, as in cherries, apples, &c. but pears are sometimes four, five, or six years before they bear.

It is expedient to train most of the principal hardy fruit-trees as full standards, that, when planted in continued rows, either in gardens or orchards, by having tall stems, they may admit the influence of the sun and air more freely to the heads, and permit the obtaining crops of esculents, grass, &c. from the ground under them.

In respect to the management of full standard fruit-trees, little is required after the first training, to form the stem to the proper height, and the first shoots are advanced at top to give the head its first formation, being allowed to advance nearly in their natural order, except reducing any very irregular growths, permitting the whole to shoot both in length and branch laterally in their own way; by which they naturally form fruit-spurs along their sides upwards for bearing.

The irregular branches must, however, be removed, and the heads kept properly thinned, as well as the suckers rubbed off from the stems or other parts. See PRUNING.

Standard fruit-trees with high stems are sometimes planted against walls, and trained as wall-trees; this is practised for high walls, so as immediately to cover the upper parts of them, whilst Dwarfs and Half Standards cover the bottom and middle parts, and thus every part of the wall is fully occupied at once: but in these cases the dwarf-trees are to remain, the others being wholly destroyed after a time. See WALL-TREES.

These sorts of high standards are likewise occasionally placed against the ends of buildings; some choice sorts of pears in particular: also apricots in a southerly aspect, and other fruit-trees of the same kind.

Half Standards.—These are trees trained with stems only three or four feet high, then suffered

to branch out to form heads. It is practised for many sorts of fruit-trees, both as detached standards for variety, and with fanned spreading heads, as wall-trees for high walls.

The method of raising these is nearly the same as for the full standards; only they are grafted or budded upon lower stocks, training them with upright single stems only three or four feet high, by the stocks on which they are grafted being trained up to that height for a stem; or by being grafted or budded low in the stock, and the first main shoot of the graft, &c. led up for a stem, and topped at that height to force out branches to form the head; suffering the heads in those designed as detached standards, to branch out all around, and run up to a full spread, nearly according to their natural mode of growth, except just reforming any ill-growing branch, as shortening the branches should be sparingly practised, as it would force out numerous useless shoots, and prevent the formation of bearing wood, especially in the apple, pear, plum, and cherry kinds.

When Half Standards are intended for walls, they should have the head trained in a somewhat fanned manner, to spread to the wall like a common wall-tree.

When it is necessary to have them to form heads of as moderate growth as possible, especially in the detached half-standards for small compartments, they should be grafted or budded upon the more dwarfish sort of stocks, as apples upon codlins, and pears upon quinces, &c.; in which case the heads will always shoot moderate, and never ramble wide or grow high. See Stocks.

But though a few of this sort of trees may be eligible as detached half standards for variety, they are not proper for the open quarters of the garden; as their branches coming out low may impede the growth of under-crops.

For walls, however, that are eight or nine feet high, they are proper to plant between the dwarfs or principal residents, to cover the middle or upper half of the wall, whilst the dwarfs occupy the lower space. See Wall-Trees.

Half Standard cherries, apricots, &c. are also proper to plant in forcing-frames to produce early fruit. See Forcing-Frames.

The after-management of detached trees of this sort, in respect to pruning, is nearly the same as the full standards, as, after having shot out at top to form the head, they should be permitted to branch both in length and laterally nearly in their own way, except just pruning to order any considerable irregularity, crowding branches in the middle or long ramblers, and detaching all suckers from the root, stem, and head, and to cut out casual dead wood; and thus the regular branches remaining at length, will emit fruit-spurs abundantly in every part for bearing.

The Half Standards against walls are to be pruned and managed as other wall-trees, each according to its nature.

Dwarf Standards.—These are trained with low stems only one or two feet high, and then topped to force out branches to form the head.

Several sorts of choice fruit-trees are trained as dwarf standards, with stems not more than one foot high, branching out at that height, forming proportionably low heads; being occasionally planted round the borders of the kitchen- or pleasure-garden, &c., instead of espaliers, and the heads either kept down low by close pruning, or suffered to branch upward nearly in their natural growth. These are raised by grafting, &c. upon the most dwarfish stocks, such as apples on codlin- or paradise-stocks, and pears on quinces, &c. in order to dwarf them as much as possible in their growth; and as they shoot in height, each year's shoots either pruned short, to keep the head down and confine it within a small compass; or the branches permitted to shoot in length, except just reducing casual ramblers and disorderly growers. These kinds of dwarf standards are not so generally introduced now, as espalier fruit-trees have been brought to a proper degree of perfection in training and bearing.

Some have Dwarf Standard fruit-trees in pots, for the purpose of forcing in hot-houses, forcing-frames, hot-beds, &c. particularly early May and May-duke cherries, plums, peaches, nectarines, apricots, figs, vines, gooseberries, currants, &c. which being placed as above, in January or early in February, often ripen a few fruit very early in tolerable perfection, some of which might be brought to table growing on the trees in the pots. Dwarf Standard fruit-trees are also proper to plant fully in the borders in forcing-frames. See Forcing-Frame, and Dwarf-Trees.

The different varieties of currants and gooseberries may be trained with a single stem a foot or more high, and then permitted to branch out into a regular head, keeping the internal part always tolerably open, and the branches moderately thin; and shortening them but sparingly, particularly the gooseberry, by which dwarf shrubby plants are formed.

STAFF-TREE. See Celastrus.

STAG'S-HORN-TREE. See Rhus.

STAPELIA, a genus containing plants of the succulent perennial kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Contortæ*.

The characters are: that the calyx is a one-leafed perianth, five-cleft, acute, small, permanent: the corolla one-petalled, large, flat, thick, five-cleft beyond the middle: segments wide, flat, acuminate: nectary, five leaflets, spreading, linear, grooved, emarginate with a dagger point, opposite to the segments of the corolla: leaflets five others, fastened alternately with these a little higher to the tube of the filaments, and running along it, vertical, bifid: interior segment erect, with the summit bent outwards; outer segment straight, compressed: the stamina have five filaments, united into a short tube; each anther fastened internally to the base of each vertical leaflet of the nectary, and wider than it, incumbent on the stigma, short, two-lobed, two-celled, produced below on both sides into an earlet, contiguous at the margin to each of the neighbouring anthers as far as the tip, and ascending at the tip: pollen united into ten corpuscles, crescent-shaped, flattish, ascending obliquely into the cells of the anther, each on a very short pedicel, (with a tranverse base, incumbent on the upper margin of the earlet,) fastened by pairs to five small twin coloured tubercles, placed on the apex of the earlets, and adhering to the angles of the stigma: the pistillum has two ovate germs, flat inwards: styles none: stigma common to both germs, large, placed on the tube of stamens, acutely five-cornered, flat above, obliquely truncate-excavated at the sides for the reception of the anthers: the pericarpium two follicles, long, awl-shaped, one-celled, one-valved; the seeds numerous, imbricate, compressed, crowned with a down: the receptacle free.

The species cultivated are: 1. *S. hirsuta*, Hairy Stapelia: 2. *S. variegata*, Variegated Stapelia.

The first has the root composed of many strong fibres, from which arise several stalks, which send out other branches of the same shape from their side, having indentures at each angle their whole length, the points of which are erect: the stalks or branches deep green, but the angles and points of the indentures inclining to brown, especially if the plants be exposed to the open air in summer. The flowers come out from the side of the stalks upon long fleshy peduncles: the petal is of a thick leathery substance; the inside variegated and hairy, and the borders of the segments closely furnished with long brown hairs: in the centre is the double starry nectarium, the points of which are lacerated, and it is of a purple colour. It is a native of the Cape, flowering in June and July.

The second species has many branches the size of a man's finger, four or five inches long, having several protuberant indentures on their sides which spread open horizontally, and ending in acute points; these branches spread on the ground and emit roots from their joints; they are angular, and of a deep green colour in summer, but in winter change to purplish; they abound with a viscous juice of a nauseous taste: from the side of the branches towards the bottom comes out the peduncle, at one of the sinuses; it is short, and sustains one flower of a yellow colour spotted with purple; it is a native of Africa, flowering in June and July. There are others that may be cultivated.

Culture.—These sorts are readily increased by cuttings or slips of the young branches, which should be exposed a few days in a dry covered place to heal over the cut part, and be then planted in pots filled with light poor dry fresh sandy earth with lime rubbish, plunging them in the tan-bed of the stove, where they soon strike root; when they are well rooted they may be removed into separate pots, replunging them in the bed till fresh rooted, when they may be placed on the tops of the flues, or on shelves in the hot-house; they are also capable of being preserved in the green-house; they have a fine effect in their leafless watery appearance and the beauty of their flowers.

STAPHYLEA, a genus containing plants of the hardy deciduous flowering shrubby kind.

It belongs to the class and order *Pentandria Trigynia*, and ranks in the natural order of *Trihilatæ*.

The characters are: that the calyx is a five-parted perianth, concave, roundish, coloured, almost as big as the corolla: the corolla has five oblong petals, erect, like the calyx: nectary from the receptacle of the fructification, in the bottom of the flower, concave, pitcher-shaped: the stamina have five oblong filaments, erect, length of the calyx: anthers simple: the pistillum is a thickish germ, three-parted: styles three, simple, much longer than the stamens: stigmas obtuse, contiguous: the pericarpium has three capsules, inflated, flaccid, united longitudinally by a suture, opening inwards by the acuminate apexes: the seeds two, bony, globular, with an oblique point and an orbicular excavation by the side of the apex.

The species are: 1. *S. pinnata*, Five-leaved Bladder-nut: 2. *S. trifolia*, Three-leaved Bladder-nut.

The first has several shrubby stalks arising

from the same root, and growing ten or twelve feet high, covered with a smooth bark, and dividing into several branches, which are soft and pithy: the leaves are composed of two pairs of ovate leaflets terminated by an odd one; these differ greatly in size, according to the strength and vigour of the shrub; some being more than two inches long, and an inch and half broad; but on old weak shrubs they are much smaller, are smooth, entire, and of a light-green colour, standing upon pretty long footstalks: the flowers come out upon long slender pendulous pedunCles, from the axils of the stalks near their extremity, in oblong bunches: the petals are white, and expand in form of a rose: the flowers appear in May. It is a native of the South of Europe.

The second species has a more substantial stem than the first, the bark of the old branches and stalks is smooth and of a gray colour; that of the young ones of a light green and very smooth: the leaflets are ovate, ending in a point, and serrate on the edges; the largest three inches long and two broad; but in old plants they are not much more than half the size: the flowers are produced from the side of the branches in longer bunches than those of the former sort, but their peduncles are much shorter; the flowers are of a clearer white, and their petals are somewhat larger; as are also the bladder capsules. It is a native of North America.

Culture.—These plants may be increased by seeds, suckers, layers, and cuttings. The seeds should be sown as soon as they become ripe, in the autumn, in a bed of common earth, to the depth of an inch; they should be kept clear from weeds, and refreshed in dry weather with water frequently: in the following autumn or spring the large plants should be removed into nursery-rows, at two feet apart and one foot distant in the rows, to remain till of sufficient growth for the shrubbery; the suckers may be taken up in autumn or early in the spring, with root fibres to them, and planted in nursery lines in the above manner: the layers may be put down from the young branches being either slit or twisted, and when properly rooted in the following autumn be planted out in the nursery as above: the cuttings should be made from the lower parts of the young shoots of the preceding year, planting them in a shady border in the autumn, and watering them frequently during the spring and summer when the weather is dry; and when well rooted, in the autumn following, planting them out in nursery-rows as above, or where they are to remain: they afford ornament and variety in the shrubbery parts of pleasure-grounds.

STAR APPLE. See CHRYSOPHYLLUM.

STAR FLOWER. See ORNITHOGALUM.

STAR HYACINTH. See SCILLA.

STAR OF BETHLEHEM. See ORNITHOGALUM.

STAR THISTLE. See CENTAUREA.

STATICE, a genus comprehending plants of the hardy, herbaceous and under-shrubby kinds.

It belongs to the class and order *Pentandria Pentagynia*, and ranks in the natural order of *Aggregatæ*.

The characters are: that the calyx is a common perianth, of a different structure in the several species: the perianth proper one-leafed, funnel-form: tube narrowed: border entire, plaited, scariose: the corolla funnel-form: petals five, united at the base, narrowed below, above wider, obtuse, spreading: the stamina have five awl-shaped filaments, shorter than the corolla, inserted into the corolla by their claws: anthers incumbent: the pistillum is a very minute germ: styles five, filiform, distant: stigmas acute: the pericarpium is an oblong capsule, somewhat cylindrical, membranaceous, five-cusped, one-celled, valveless: proper calyx contracted at the neck, expanded in the border, cherishing the capsule when the corolla withers: seed single, oblong, hanging from a long cord.

The species cultivated are: 1. *S. Armeria*, Thrift, or Sea Gilliflower: 2. *S. Limonium*, Sea Thrift, or Sea Lavender: 3. *S. cordata*, Heart-leaved Sea Lavender: 4. *S. reticulata*, Matted Sea Lavender: 5. *S. echioides*, Rough-leaved Sea Lavender: 6. *S. speciosa*, Plantain-leaved Sea Lavender: 7. *S. tatarica*, Tartarian Sea Lavender: 8. *S. pectinata*, Triangular-stalked Sea Lavender: 9. *S. suffruticosa*, Narrow-leaved Shrubby Sea Lavender: 10. *S. monopetala*, Broad-leaved Shrubby Sea Lavender: 11. *S. ferulacea*, Cut-leaved Sea Lavender: 12. *S. sinuata*, Scallop-leaved Sea Lavender.

The first has a perennial woody root, bearing many thick tufts of lax, linear, channelled, smooth, entire leaves: the scapes erect, simple, pubescent, varying much in height (from two to eight inches or even a foot), terminated by a globular head of many flowers, encompassed by a many-leaved involucre, the base of which is attached to a singular cylindrical membranous sheath, about an inch long, and investing the top of the scape, its lower end being loose and lacerated, so that it seems to have been torn off from the root, and carried up with the young growing stem: the calyx small, erect: the corolla rose-coloured or pink (varying to deep red, scarlet and white). It is a native of Europe and North America: it flowers from June to August.

There are several varieties: as with red flowers, with scarlet flowers, with white flowers. Great Thrift with red flowers, with white flowers; and Small Sea Pink, with flesh-coloured flowers.

The second species has scarcely any resemblance to lavender, and none of its aromatic quality; has a strong, perennial, woody root: it varies much as to luxuriance, being sometimes found with leaves scarcely an inch long, and not more than six or eight flowers in a panicle, and at other times much larger, with the flowers far more abundant, of a bright blue colour, which distinguish it at a distance: it is a beautiful plant. It is a native of Britain, flowering in July.

There are several varieties: as Common Great Sea Lavender; Great Late-flowering Sea Lavender; Olive-leaved Sea Lavender; Deep Blue-flowered Sea Lavender; and White-flowered Sea Lavender.

The third has the stalks naked, about six inches high: leaves wedge-shaped, emarginate at the end, and sometimes quite entire, rigid, running down into the petiole; varying in size, according to the soil: the flowers numerous, blue, imbricate, one-ranked, sometimes pale red, appearing in August, but never produce seeds in this climate. It grows naturally near the sea, about Marseilles, Leghorn, &c.

The fourth species has a strong root, woody and perennial, bearing thick tufts of small narrow obovate spatulate or wedge-shaped leaves, slightly pointed but not awned, and entire: the scapes prostrate, very much branched: the branches flexuose, matted and entangled with each other, having an ovate sharp membranous bracte at each divarication: many of the branches are barren, and those often reflexed, but not always: the flowers few together in simple terminating spikes or bundles, erect, each enveloped in three or four larger blunt bractes: the ribs of the calyx, and the petals, are of a bright purplish blue, which turns white in drying. It is a native of the South of France and Malta.

The fifth is an annual plant, (biennial) with long narrow leaves, which are set with rough tubercles; the stalks about eight inches high, dividing into two or three small branches, which are terminated by short reflexed spikes of pale blue flowers, coming out late in August, and seldom perfecting seeds in this climate: it is a native of the South of Europe and Barbary.

The sixth species has many radical leaves, oblong, smooth, curled, ending in a sharp point: the stems a foot high, branched, round, firmer than in the other species, sometimes winged, three or four spreading round the bottom, where there is abundance of very elegant flowers which are larger than those of the second sort and white, forming a handsome silvery head.—It is a native of Russia, flowering in July and August.

The seventh has the leaves about four inches long, and thee quarters of an inch broad in the middle, diminishing gradually to both ends: the stalks rise about five or six inches high, dividing into several spreading branches, which are again divided into smaller; these are terminated by spikes of pale-blue flowers ranged on one side the footstalk: the whole, when growing, being spread wide, has somewhat the appearance of an umbel of flowers, which come out in August, but never ripen seeds in this climate. It is a native of Russia, flowering in June.

The eighth species is a native of the Canary Islands, flowering in September and October.

The ninth is a native of Siberia, flowering most part of the summer.

The tenth species has a shrubby stalk about two feet high, dividing into several woody branches, which spread out on every side; the lower parts of these are closely furnished with gray leaves of a thick consistence: the branches are terminated by panicles of blue flowers, coming out singly at a distance from each other, having one funnel-shaped petal, with a long tube, and dividing into five spreading segments at top: it flowers from June till autumn, but never produces seeds in this climate. It is a native of Sicily.

The eleventh has round stems, somewhat woody, naked with alternate chaffs, panicled: the branchlets very much subdivided, in bundles, filiform, imbricate with very minute chaffs, terminated by a little bristle: the flowers subimbricate, ascending, directed one way, yellow. It is a native of Spain, of Portugal, and of Barbary.

The twelfth is a biennial plant: the lower leaves, which spread on the ground, are indented almost to the midrib; these indentures are alternate and blunt: the stalks rise a foot and half high, dividing upwards into several branches, having at each joint three narrow leaves sitting close to the stalks, from the base of which proceeds a leafy membrane or wing which runs along on both sides the stalk; these are rough and a little hairy: the stalks are terminated by panicles of flowers, which sit upon winged peduncles, each sustaining three or four flowers of a light blue colour, which continue long without fading: it flowers in July and August; but unless the summer is warm and dry, the seeds do not ripen in this climate. It is a native of Sicily and the Levant. There are two

varieties, which differ in their leaves, stems, and flowers.

Culture.—All the sorts are capable of being increased, by parting or slipping the roots: this, with the first kind, should be performed in the autumn or very early spring season, planting them immediately as edgings, or in the borders; they should not however be parted too small.

When planted out as edgings, a quantity of slips should be obtained in these seasons from old plants, by slipping or dividing the off-sets of their roots, each slip being furnished with roots and tops; then, having made up the edge of the bed or border even and firm, planting them either with a dibble in one range, two or three inches distance in the row; or to form at once a close edging, so near as to touch one another, or in a small trench, close, as in planting box edgings: these edgings should every summer, immediately after flowering, be trimmed with garden-shears, or a knife, to cut off all the decayed flower-stalks close to the bottom; likewise to trim in any projecting irregularity of the edging at the sides or top: also when it spreads considerably out of bounds, should be cut in evenly on each side, in due proportion; performing those trimmings in moist weather, and not too late in autumn, otherwise the drought of summer, or the cold in winter, will be apt to injure them when newly cut, and cause them to have a shabby disagreeable appearance: but when these edgings grow considerably out of bounds, or become very irregular, it is necessary to take them up, slip the plants small, and immediately replant them again as before, in a neat regular edging: they sometimes require replanting every three or four years in this manner.

The second sorts may likewise be raised by parting the roots in the autumn or spring, preserving some mould to them, and planting them out again immediately, being placed in an east border, where the soil is loamy.

They may also be raised from seeds obtained from abroad, sowing them on a similar border, keeping the plants clean, and when of sufficient growth planting them out in pots: it is the common practice in treating the second sort, according to Martyn, to consider it as a green-house plant; and it appears to the greatest advantage in a pot, as it is much disposed to throw up new flowering-stems: by having several pots, some plants will be in flower throughout the summer; on this account, and for the singularity of its large blue calyx, it is a plant that merits attention. The Echioides is also a green-house plant.

The eighth, ninth, tenth sorts, &c., may be increased by planting cuttings of the young shoots, in July, in a shady border, watering them frequently: when the plants have a little growth, they should be taken up and placed in separate pots, filled with light loamy mould, putting them in the shade till rerooted: the plants of these sorts must be removed into shelter in the autumn, but they only require protection from hard frost, of course may be placed with myrtles, and other hardy green-house plants, where they often continue to flower a great part of winter, and make a pretty variety; these sorts afford variety among other potted more hardy green-house plants.

STAVE'S ACRE. See DELPHINIUM.

STOCKS, such young trees as are raised from seed, suckers, layers, and cuttings, and designed for the reception of grafts and buds of other trees, to continue them the same and become trees in every respect like the parent trees from which they were taken.

Stocks for general use are proper when from the size of a good large goose-quil to half an inch, or not more than an inch thick, in the part where the graft, &c., is to be inserted; but they are sometimes used when two or three inches in diameter: these are made use of in most kinds of fruit-trees, and occasionally for some varieties of forest and ornamental trees, and many of the shrub kind: they should in general be species or varieties of the same genus as the trees with which they are to be engrafted.

They are usually divided into three kinds; as *Crab Stocks*, *Free Stocks*, and *Dwarf Stocks*, each comprehending various sorts, both of the same and different genera, species, and varieties.

Crab Stocks.—These are all such as are raised from seeds, &c., of any natural or ungrafted trees, particularly of the fruit-tree kind; such as the crab-apple of the woods and hedges, any kind of wild thorny uncultivated pears, plums, wild black and red cherry, &c., and also of such trees as have been grafted or budded: some sorts, being strong shooters and hardy, are preferred, on which to graft particular species, to improve the size and duration of the trees; for example, apples are very commonly worked upon the common wild crab stock, and cherries on the great wild black and red cherry stock, as tending to promote a large, hardy, and durable growth, proper for common standards and the larger kinds of dwarf trees. In using crab stocks to graft any sorts of fruit-trees, it is proper to reject such of them as assume a very wild crab-like growth, or of a stunty, thorny nature, preferring those that are the freest clean growers: sometimes, however, the appellation of crab stocks is given to all stocks indiscriminately,

before being grafted; whether raised from the seed, &c., of wild or cultivated trees, until worked with grafts or buds; but with the distinction of wild crabs, and free crabs.

Free Stocks.—This is commonly applied to such as are raised from the kernels of the fruit, layers, &c. of any of the cultivated garden and orchard fruit-trees and others, which often prove more free clean shooters than the wild crabs, and are more proper than they for choice apples, pears, peaches, nectarines, apricots, and plums, to improve the growth of the trees and quality of the fruit.

Dwarf Stocks.—These are such as are raised from low growing trees, of a shrub-like nature, or but very moderate tree-growth, being used for the lower and middling sorts of standards, and to form dwarfs, either for walls or espaliers, or as dwarf standards in small gardens, and others occasionally for variety, as well as for planting in forcing-frames, or to pot for forcing, or curiosity, &c., as the paradise apple and codlin stock, for dwarfing apples; the quince stock, for pears; the bird cherry, morello, and small May cherry stock, for cherries; the bullace and muscle stock for dwarfing apricots, peaches, and nectarines, and sometimes dwarf-almond stocks for the two latter, when designed to have these trees of a very dwarfish growth, either to pot for curiosity, or for forcing in small forcing-frames.

The most dwarfish kinds are: the paradise stock, bird-cherry, black bullace, and dwarf almond; but they are not so proper in general culture as common dwarf trees, as they never attain a large growth, sufficient to produce any considerable quantity of fruit: the codlin dwarf stocks, quince stock, morello cherry, and muscle-plum stocks, are proper for the middling or larger kinds of dwarf trees, either for walls or espaliers, or dwarf and half standards: they are all raised from suckers, layers, or cuttings.

Sorts of Stocks adapted to each Kind.—For apples, in all the kinds, they are those of their own sort, raised from the kernels of any of the cultivated apples or crab for common standards, and the larger kinds of dwarfs; but the wild crab stock is often esteemed preferable to the free stock, for its hardy and durable nature, on which to graft common standards, and sometimes dwarfs for espaliers; and for lower dwarfs, the codlin, Siberian crab, and paradise stock are sometimes used; the former for middling dwarfs, and the latter for the smallest dwarfs: they are all easily raised, the free stock and crabs from the kernels of the fruit; and the codlin and paradise stock, likewise from suckers, layers, and cuttings. See PYRUS MALUS.

For the pear, it is chiefly grafted and budded on pear stocks for general use, but on quince for dwarfs; the former chiefly raised from the kernels of any sort of pears; and the latter freely by suckers, layers, and cuttings; but the pear stock is always to be preferred for the general supply of larger trees, for all common standards, and the larger dwarf pear trees for extensive walls and espaliers: the quince stock is estimable principally for its dwarfing property, or in being productive of moderate shooting trees for walls, espaliers, or middling standards, sooner arriving to a bearing growth. In order to form dwarf pears, white-thorn stocks, raised from seed, were formerly sometimes in repute, but they are very improper, as the trees rarely prosper well; as the goodness of the pear is often improved or diminished by the nature of the stock on which it is grafted, it is of importance to use free stocks, raised from the kernels of the best summer and autumn pears as much as possible; and the prime pears should be worked always on the finest free-shooting stocks of the most cultivated-like growths: sometimes, to improve the quality of particular choice kinds of pears, it is the practice to double work them, which is to graft the best sorts into free stocks in the spring, which shoot the same year; then about midsummer, or soon after, to bud the young shoots of the graft with buds of the prime sorts of pear, suffering only the shoots from the second budding to run up to form the tree: the breaking kind of pears are often rendered less hard and stony in this way, and the melting property of others is considerably improved. See PYRUS *communis*.

For quinces, two sorts of stocks are occasionally used, as that of its own kind, and the pear stock; the quince stocks are raised from seed, suckers, and cuttings, &c., and the pear kinds from the kernels of any sort of pears; but as all the varieties of quinces are so expeditiously raised with certainty the same by layers and cuttings, it renders the raising of stocks for grafting or budding them on almost unnecessary. See PYRUS *Cydonia*.

For plums, the operation is performed only upon stocks of their own kind, raised from the stones of any sort of cultivated plum, or by suckers and layers, as the most certain methods to obtain any particular variety of free plum stock, as the muscle-plum stock, which many prefer as the best stock of all on which to work the finer kinds of plums, as generally producing very thriving moderate-growing, fruitful trees; raising it, not from seed, which would vary exceedingly, but by suckers from the root of real muscle-plum trees, or of those worked upon

the true muscle stock, or from layer stocks of the muscle-plum tree: the plum will also grow upon the apricot and cherry stock, but not in a thriving state for any length of time. See PRUNUS *domestica*.

For cherries, the proper stocks are those of the cherry kind only; as the great wild cherry stock for large trees, the cultivated garden cherries for the more moderate growths, and the bird-cherry stock for small dwarfs: the two former are raised from the stones of the fruit, and the latter also by seed, or by layers and cuttings: for general use, the wild black and red cherry stocks, being strong free growers, are preferable for all common large standard cherries, also the larger dwarf-trees for extensive walls and espaliers; as these stocks, being of strong hardy growth, generally produce larger, more hardy and durable trees than the cultivated cherry stocks: sometimes stocks of the morello and May cherry, as being moderate growers, are used to raise the smaller cherry-trees, either in dwarfs for low walls and espaliers, or for small or moderate standards; but the former when raised from layers is more certain of producing the real sort in its naturally moderate growth: the common bird-cherry, as being a very moderate grower, is used to raise dwarf cherry-trees, either to plant in borders, pots, forcing-frames, or to pot for forcing, &c.: they are raised plentifully from seed, cuttings and layers; and have the effect of dwarfing trees exceedingly, so as to bear fruit when but one or two feet high; and shooting very little to wood, generally bear abundantly for their size: and cherries will also grow upon plum, apricot, and laurel stocks, as being of the same genus. See PRUNUS *Cerasus*.

For apricots, these prove the most durable on stocks of the plum kind, as common plum stocks of any variety for all common wall, espalier, and standard trees; and the bullace stock for small dwarfs; the plum stocks are raised from the stones of any kind of cultivated plum, or by suckers from the root; and the bullace from seed, suckers, and layers: though they succeed almost equally well upon stocks of any kind of plum, it is probable they may prove the most successful on the muscle-plum stock, like peaches, &c., as being of a more moderate regular growth, and more prolific nature: the bullace stock is only used occasionally to raise moderate small dwarfs for low walls, or to plant in pots, or in forcing frames for forcing: the apricot will likewise grow on its own, and on peach and almond stocks raised from the stones, but never in so prosperous or durable a manner. See PRUNUS *Armeniaca*.

For peaches, several sorts of stocks are occasionally used; as almond, peach, nectarine, apricot, and plum stocks: they are all raised from the stones of the fruit, and the latter also by suckers and layers; but the plum stock, being the most hardy, is the most proper for general use; but the free plum stock is preferable for all the sorts of peaches and nectarines, as being productive of the most hardy, thriving, and durable trees; though it is remarkable, one sort of plum stock in particular is generally preferable on which to work peaches, which is that of the muscle-plum, as producing the most prosperous trees, and of a more moderate, regular, and fruitful growth, the fruit being of a superior quality, when the stocks are genuine; being raised from suckers or layers of the true muscle-plum-tree, or by suckers from the roots of such peach, nectarine, plum, &c., as are worked on muscle-plum stocks, which generally send up plenty from the roots annually; planting them off at one year's growth into the nursery to train them for use: double stocks, or double working, is sometimes used for the more delicate peaches, to improve their bearing, and the flavour of the fruit.

For nectarines, the same stocks as in the peach are used: as almond, peach, nectarine, apricot, and plum; all raised as for the peach tree: the plum stock should be preferred in general as for peaches.

For almond-trees, when raised for their fruit, the approved varieties may be budded into stocks of any sort of almond, peach, nectarine, apricot, or plum, raised from the stones, and the latter also from suckers, &c., but the trees are generally the most hardy and durable on plum stocks. See AMYGDALUS.

For medlars, three or four different stocks are occasionally used, to raise the approved varieties: as the medlar, white-thorn, pear, and quince stocks, the three former raised from seed, and the latter from suckers, layers, and cuttings; the medlar seedling-raised stocks are very proper to graft the approved varieties; and the white thorn and quince stocks are only used occasionally; but free stocks, raised from the kernels, of medlars or summer or autumn pears, are preferable to the two last for all the varieties of common medlar, which, either on their own or pear stocks, generally assume a more free growth, and produce the fruit in greater perfection and abundance. See MESPILUS.

For sweet service-trees, when designed as fruit-trees, the approved varieties should be grafted or budded upon proper stocks; either principally their own raised from the seed, or occasionally on pear or quince stocks, raised as for

the medlar and other trees; though any of the sorbus, or the pear, are preferable to the quince to work this tree on to have it large and durable: but quince stocks may be used to have trees of smaller growth, for low standards, espaliers, &c.

For the wild maple-leaved service berry-trees, the proper stocks are either their own kind, or those of the hawthorn, raised from the seed; they also take upon pear stocks, &c.

For hazel nuts, filbert, &c., the stocks of the common nut-tree, raised either from the nuts, or by suckers from the root, may be used; but this method is seldom employed. See CORYLUS *avellana*.

For orange trees, these are worked upon stocks of their own kind only, as any kind of orange, lemon, or citron stocks, raised from the kernels of the fruit; though the Seville orange, as being a very free strong shooter, is generally preferred for orange stocks; but the lemon and citron being also free growers form very proper stocks to raise any variety of oranges on. See CITRUS *Aurantium*.

For lemon and citron trees, these varieties are also budded or inarched upon lemon, citron, or orange stocks, raised from the kernels of the fruit, as for oranges. See CITRUS *medica*.

It is evident, that in this method, for curiosity, the same stock may be made to support two, three, or more different varieties of fruit, grafted or budded, either all into the stock, being previously trained with branches, forking off for the purpose one for each graft, or by cleft, or crown-grafting single large stocks, with two or more different sorts; or in smaller single stocks, by inserting two or more different buds by inoculation; likewise, the stock being singly grafted or budded, different sorts may be inserted into the shoots arising from the graft or buds; and thus two, three, or more sorts of apples may be had on the same root; and by the same method, different sorts of fruit may be had upon the same stock, as plums, cherries, and apricots all on a plum stock; or peaches, nectarines, and apricots on the same, or on stocks of their own kind; and pears, medlars, and quinces upon the pear stock; also red and white currants, or currants and gooseberries, on a currant or gooseberry stock; or white and red grapes on a vine stock; likewise red and white roses, or other different sorts, upon a common rose stock; as well as on numerous other trees and shrubs, which are species or varieties of the same genus.

Raising the Stocks.—All the different sorts may be raised by seeds, suckers, layers, and cuttings.

In the first mode, various sorts of stocks may be raised from the stones and fruits of different sorts of trees: as the kernels of all the apple kinds, pears and quinces; and the stones of plums, cherries, apricots, peaches, and nectarines; the seeds or stones of medlars, services, &c.; also nuts, when designed for stocks; all of which should be obtained in autumn from their respective fruits when fully ripened; and when well cleared from the pulpy substance, each sort may be sown separately, in beds of common light earth in the nursery, either directly, or after being preserved in sand till February, but the early autumn is the best season; and if the winter should prove severe, the beds of the more tender kinds, as almonds, and peaches, &c., may be covered with dry litter to defend the seed from the frost. See NURSERY.

Before the appearance of the plants above ground, where the surface of the bed is hard bound or caked, it is beneficial to stir the surface lightly with a small iron rake; also, if very dry weather prevails, to give frequent moderate waterings, both before and after the plants are up, repeating the waterings occasionally in dry weather all spring and early part of summer, to encourage a free strong growth; being likewise careful to keep the beds very clean from weeds by diligent hand-weedings; and by thus giving every encouragement, the seedling stocks will grow so freely during the summer, as by autumn or spring following to be mostly of a proper size to plant out into nursery lines in the open quarters, in rows two feet asunder, to remain for grafting and budding; though, if they have made but middling progress the first summer in the seed-bed, and are rather small and weakly, the strongest only should be planted out, leaving the rest growing until next autumn, when they will be all of full size for planting out wholly into the open prepared nursery quarters, forking the seedling plants up out of the beds, shortening any perpendicular tap-root and long stragglers, but leaving all their tops entire, and then planting them in lines, either by trench-planting, slit-planting, or dibble-planting, as the sizes of the plants admit, in rows two feet or two feet and a half asunder, setting the plants one foot or fifteen inches apart in each row, in an upright position; and after having planted one row, treading the earth gently all along close to the roots of the plants, to fix them firmly in the earth all evenly in a straight range, proceeding in the same manner, row and row, till the whole is planted, levelling the surface of the ground between all the rows with the spade or rake: their future culture, till grafted or budded, consists in occasional waterings in the first spring, hoeing over the ground every summer, digging

between the rows annually in the winter or spring; and training the stocks each to one stem; preserving their top always entire; but trimming off the strong laterals below, to encourage the strength of the main stem, when they will be fit for grafting or budding, in from one to two or three years. See PLANTING.

They are proper for working when from about the size of a large goose-quill, as already observed, to the thickness of a man's little finger, or a little more; but the sooner they are worked after they are of a due size, the better they succeed, and the sooner they form trees. See GRAFTING and BUDDING.

In some cases, however, where the stocks have shot freely the first summer after planting out from the seed-bed, many of them may probably be of a due size to graft the following spring and summer, at five or six inches height, to form dwarfs for walls and espaliers, &c., or even, in some sorts, for full or half standards, provided the first main shoot from the graft or bud is trained up singly, two or three years, to form the stem, of from four or five to six or seven feet stature: however, if they have grown but moderately the first and second seasons, and are not generally in a condition for the operation of grafting or budding, it is better to let them have another year's growth.

In the second mode, the suckers of all the trees which afford them should be planted off at one year's growth in autumn, winter, or spring, which is a very expeditious method of raising several sorts of stocks; so that, after being transplanted into the nursery, they often in one or two years' growth afford proper stocks for the reception of grafts and buds; and many of them are often fit for budding in the summer following, at the proper budding season, or for grafting the spring after.

The suckers are generally fit to take up for the purpose of stocks, when of one year's growth, about the size of a tobacco-pipe, or but little bigger, and should be collected in autumn or the early part of winter; taking them up as well rooted as possible, cutting off all knots or knobbed woody parts of the old roots that may adhere to their bottom, trimming the straggling fibres, and cutting off all side-shoots from the stem; then planting them in rows two feet asunder, and one foot distant in the lines; treading the mould gently to their roots, and finishing the work by levelling the surface between the rows: the culture afterwards, till grafted or budded, is nearly the same as that of the seedling stocks, keeping them clean from weeds in summer by hoeing; and probably some of the strongest shooters may be fit to bud in the July or August following; though the general part will require two years' growth before they are proper for working; still continuing them all to one stem, by timely displacing strong laterals, and preserving their top or leading shoot generally entire until grafted, &c.

The third method is practised for some sorts of stocks of fruit and other trees, and when any particular variety of stock is required, such as the paradise stock for apples, muscle-plum for peaches, &c., that they may be obtained of the real sort with certainty: but as this method of raising stocks would be attended with great trouble for general grafting and budding, it is only practised occasionally. In providing them in autumn or winter, some of the young shoots of such trees as have the branches naturally growing near the ground, or in which the stems have been cut down low while young, to force out branches near the bottom, to furnish shoots properly situated for laying, should be slit-layed in the common method, when they will mostly be rooted by the autumn following, and be fit to take off and plant into the nursery, being managed as directed for the seedling and sucker stocks.

In the last method, cuttings of the last year's shoots should be chosen in autumn, planting them in the nursery, in a somewhat shady border, giving occasional waterings the following spring and beginning of summer in dry weather, when they will be mostly well rooted by next autumn, and may be then planted out in nursery-rows two feet asunder, managing them as the others: they should be kept with upright stems, except any should assume a stunted or crooked growth, in which case they should be headed down to the ground in spring, when they will push out strong from the bottom the ensuing summer, training them to one stem, and with their leading top-shoot entire as above; and according as all the sorts advance in growth, they should be divested of strong lateral shoots below, repeating it particularly in the taller standard stocks, to encourage their upright direction more expeditiously to the proper grafting and budding heights.

The proper methods of grafting and budding are shown under the culture of the different kinds.

STONE-CROP. See SEDUM.

STONE-CROP TREE. See CHENOPODIUM.

STOOLS, such headed-down young trees and shrubs in the nursery as are appropriated for the production of an annual supply of lower shoots or branches near the ground, properly situated for layering. See LAYING.

Trees and shrubs for this purpose are generally headed down to the bottom in the nursery,

&c., in order to force out more effectually a plentiful supply of branches near the ground, to afford layers conveniently situated for laying down in the earth, which being layed in autumn, winter, or spring, they strike root in a year or two; each layer commencing a distinct plant, and is planted off into the nursery in autumn following; the stools, remaining, send out a further supply of lower shoots the following summer, for laying as before; and thus the same stools continue affording supplies fit for laying annually, or every other year: for this purpose, some of the strong young trees and shrubs should be chosen, which should be planted in the nursery, &c., at from five or six, to eight or ten feet distance, according to their size or nature of growth; and after having remained a year or two till firmly rooted, and they have acquired some substance, all those of the tree kind, or such others as run up with stems, without affording lower branches near the ground for laying, should, in the autumn, winter, or early in the spring, be headed down within a few inches of the ground; by which, in the summer following, they push out from the bottom plenty of strong young shoots near the ground for laying, which may be put down in the succeeding autumn, winter, or spring; or, if any remain, till the second autumn, the first shoots sending out many lateral or side shoots the ensuing summer, which may furnish an additional supply, of a proper growth for laying; these small laterals being often better adapted for rooting than the first vigorous shoots that rise immediately from the stool, and each of which layed will form a new plant. See LAYING.

Every year, soon after the layers are separated from the stools, the latter should be dressed, by cutting off all the parts of old branches and scraggy stumps from the head, within an inch or two of the main stool; and then digging and levelling the ground neatly about and between the whole, and in the spring and summer giving occasional hoeings in dry weather to destroy weeds: sometimes stools for layers are formed occasionally of trees, &c., that are considerably grown up, not having been headed down to form low stools, but the branches of which are of considerable height from the ground; in which case, the branches, if flexible and long enough, are bowed down to the earth; or, if inflexible and too stubborn to bend, are plashed, by making a gash or cut on the upper side; or if too large for plashing, or the nature of the wood does not bear that operation, the tree or shrub is sometimes thrown on its side by opening the earth about the roots, loosening or cutting those on one side to admit of lowering the head sufficiently for laying the branches in the ground; and sometimes, when stools are formed from grown-up trees, whose branches are too high for laying in the full ground, a temporary stage or scaffold is erected, on which the pots or tubs of earth are placed for the reception of the layers. See LAYING.

STOVE, a sort of garden-building or erection constructed with brick-work behind and on the north, as well as partly in front, and roofed wholly with glass sashes to the south, being furnished internally with a pit, or long, wide, deep cavity, for a bark hot-bed or beds, and with flues round the inside of the walls for fire-heat; the whole calculated to produce a certain temperature at all seasons, adapted to the culture of the tenderest exotic plants, as well as for forcing various kinds, both hardy and tender, into flower and fruit, &c., at an early season; and which was so named before the use of bark-beds, from being worked only by means of fire-heat. See HOT-HOUSE.

Besides their use in the growth and preservation of various tender exotic plants as just noticed, by their means the gardener is also enabled to forward many hardy plants to early perfection; such as various sorts of curious flowers, fruits, salad-herbs, kidney beans, strawberries, &c., probably one, two, or three months sooner than they could possibly be obtained in the open ground; and likewise many sorts of seeds, cuttings, and layers of exotics are made to grow freely in the bark-bed of the stove, that without such aid would not grow at all in this country; also cuttings, &c., of many curious hardy plants that root reluctantly in the full ground, are facilitated considerably in their rooting by the bark-bed of this department.

Different sorts of stoves are used occasionally for different purposes; as the *Bark Stove*, for common use, which has both a bark-bed and flues: the *Dry Stove*, for particular succulent plants, &c., which is furnished only with flues for fire-heat, having no bark-bed: the *Forcing Stove*, which is employed purposely for forcing hardy fruits, flowers, &c., into early perfection; being constructed both with bark-bed and flues, or only with flues.

By the uniform moderate moist growing heat in the first sort of stove, many kinds of such plants as have been mentioned are brought forward and preserved, and in which, some require the bark-bed, others succeed in any part of the house; and still others, as the succulents, require the driest situation near the flues: many of the more tender, herbaceous, and shrubby plants succeed best when plunged in the bark-bed, though the greater part of the herbaceous and

woody sorts succeed well enough in any part: the bark-bed is principally allotted for the pine-apples; and most of the smaller succulents, particularly, may be stationed mostly over the top of the flues upon shelves out of the way of moisture, as being naturally very replete with humidity: and the hardy plants designed for forcing, such as strawberries, kidney beans, and various sorts of flowers, &c., that are potted, may be placed upon shelves, or on the parapet wall of the bark-bed; but the nearer the glasses the better, particularly the strawberries; but good early kidney beans may be raised in almost any part of the stove. When any sort of flowers are to be forwarded, such as roses, pinks, &c., or any bulbous flowers, as early as possible, they may be plunged in the bark-bed, and some be placed upon shelves, &c., to succeed them. See HOT-HOUSE.

The second sort of stove, from its affording a dry heat, is intended principally for the culture of very succulent tender exotics of parched soils, that require to be kept always dry. Where there are large collections of this sort of plants, it is very useful to deposit the most succulent of them in separate stoves, for fear of the others which perspire more freely occasioning a damp air in winter, which may be imbibed by the succulents, and injure them, as being impatient of much moisture, particularly in that season: in this kind of stove moveable stands or shelves are erected above one another, on which to place the pots of plants; such as the tenderer sorts of aloes, cereuses, euphorbiums, melon-thistle, and other very tender succulent plants, &c.; but most of them may be cultivated in a common stove.

The third sort of stove is sometimes used principally for flowers, as is common about London, to force large quantities of early roses, pinks, and numerous other flowers for market, where they fetch a very great price at an early season: others are intended principally for fruit-trees, and some serve both for forcing flowers and fruits, and several sorts of small plants, as strawberries, kidney beans, &c.; so that they consist of two kinds, which are a bark forcing stove, furnished with a bark-bed and flues; and a fire forcing stove having only flues for fire without any bark-bed: the former of which is constructed like a common bark stove, being furnished with a pit for a bark-bed to receive the pots of particular sorts of plants intended for forcing, in order to forward them as early as possible; and with flues for fire-heat occasionally; and sometimes it is formed capacious enough in width to admit of a border of earth behind the bark-bed, next the back wall, serving for fruit-trees, to be planted in the full ground; such as cherries, peaches, apricots, &c., for early forcing: the bark-bed is for receiving various sorts of plants in pots in winter, for forcing to maturity of growth or production in that season or early in spring; as pots of roses, pinks, dwarf tulips, hyacinths, narcissuses, honeysuckles, hypericums, and many other flower plants of small or moderate growth, both of the shrubby and herbaceous kinds; also any curious tender annual flowers, such as balsamines, &c., may be forwarded in it; likewise pots of strawberries, dwarf cherries, and other small fruits plunged either in the bark-bed, or placed any where towards the glasses; also pots or boxes of kidney-beans, salading, &c.

The season to begin forcing in these stoves is principally from about the latter end of December to the end of January, according as the flowers, fruits, &c., may be wanted; the plants and trees intended for forcing in pots should have been potted either a year before, or in the preceding spring or autumn, and in winter sheltered from severe frost till the forcing time: it is necessary for the shrub and tree kinds in particular, as if planted or potted the preceding year or before, and they are well rooted and firmly established in the earth, it is of essential advantage; being all previously raised in the open ground, till advanced to a proper growth for flowering and fruiting; and the fruit-trees at the same time, trained in the requisite order: those intended for planting in the internal border of earth behind should be planted fully therein early in autumn, without being potted; some of which, such as peaches, nectarines, apricots, &c., being trained as wall-trees, others as low standards, particularly cherries; and vines, planted also against the front without-side, have the stems trained in through small holes, and conducted up under the sloping-glasses; but such plants as are to be raised from seed should not generally be sown till the time the pots are placed in the stove for forcing.

When the plants, seeds, &c., have been properly arranged in these stoves, they are soon set in motion by the bark-bed heat, and afterwards by making moderate fires on cold nights, and on days occasionally, in very severe weather, to support a constant proper warmth to continue the plants always in moderate growth; by which means, various flowers and fruits may be obtained two or three months before their natural season in the open air.

The latter kind, or such stoves as are worked by fire-heat only, are mostly used for forcing fruit-trees, having the whole or most part of the bottom space within formed of good rich earth,

full two feet deep, in order to plant the fruit-trees entirely in the ground to remain; an alley or walk being either formed next the back wall, or carried along the middle, allotting a raised border along the back part, for the reception of the choicer fruits to be trained as wall-trees; and the main middle space for small standards of moderate growth: in these the best sorts of apricots, peaches, nectarines, cherries, plums, vines, and figs; likewise any small fruit plants, as gooseberries, currants, raspberries; also tufts of strawberries, which should all be first trained in the open ground to a bearing state; may be introduced: the peaches, nectarines, apricots, and figs, should be planted principally toward the back wall, and trained to a treillis as wall-trees: the cherries as standards, both small-headed, moderate, full standards, half standards, and dwarfs, disposed in the middle space, the tallest behind, and the lowest forward; with pots of strawberries and low flowers, upon shelves near the glasses; and the vines either within towards the front, or wholly without, close against the front wall, and the stems, or a strong shoot of each plant drawn in through a small hole made for each, either in the wall, or in the timber of the front erections; and the branches within trained up to the inside of the sloping glass upon treillis work: in the vines planted on the outside, it is necessary to guard the stems in winter, especially some time previous to, and during, the forcing season, with hay-bands wrapped closely round them, also to lay some dry mulch over the roots, to protect the whole as well as possible, that the progress of the sap may not be much retarded by the external cold, and to promote its flowing more freely for the advantage of the internal growth of the vines, &c.

The season to begin forcing or making the fires in these stoves is January, or early in February, continuing it moderately every night and morning, during the cold weather in winter and spring, to forward the different fruits to as early perfection as possible. See HOT-HOUSE.

STORAX. See STYRAX.

STOVE PLANTS, such tender exotics from the hot parts of the world as require the aid of the stove to preserve them in this climate.

The following are the principal sorts cultivated in this country in these departments:

TREE KINDS.

Abroma, Maple-leaved Abroma.

Achras Sapota, Mammee-tree—Common Sapota—Mammee Sapota.

Adansonia, Æthiopian Sour Gourd.

Adenanthera, Bastard Flower Fence—Pavonina—Falcotaria.

Anacardium, Acajow-, or Cashew-Nut.

Annona, Custard Apple—Nettled Custard Apple—Prickly Custard Apple—Scaly Custard Apple, or Sweet Sop—Marsh Annona, or Water Apple—Broad-leaved Annona.

Bombax, Silk Cotton-Tree—Thorny Bombax, or Cuba—Pentandrous Smooth Bombax—Heptaphyllous Smooth Bombax.

Carica, Papaw or Pepo Tree—Common Indian Papaw Tree—Posoposa, or Branching Surinam Papaw Tree.

Cassia, Wild Sena—Purging-Tree Cassia—Biflorous Shrub Cassia.

Cedrela, Bastard Cedar.

Chamærops, Dwarf Palm, or Palmetto. (Frondose.)

Chiococca, Snowberry-Tree.

Chrysobalanus, Cocoa Palm.

Cinchona, Jesuit's Bark-Tree.

Clusia, Balsam-Tree.

Cocos, Cocoa-nut Tree. (Frondose.)

Cratæva, Garlic Pear.

Crescentia, Calabash Tree.

Croton, Tallow Tree.

Dracæna, Dragon Tree.

Fagara, two species.

Ficus, Fig Tree—Sacred Fig, or Indian God Tree—Sycamore Fig Tree—Bengal Fig Tree—Indian Long-leaved Fig Tree—Dwarf Indian Fig Tree.

Guaiacum, Lignum Vitæ; three species.

Guettarda, one species.

Guilandina, several species.

Hæmatoxylum, Blood-wood, or Log-wood.

Helicteres, Screw Tree.

Hernandia, Jack-in-a-Box Tree—Sonorous Hernandia—Oriental Hernandia.

Hymenæa, American Locust Tree.

Laurus, Bay Cinnamon Tree—Alligator Pear.

Mammea, Mammee Tree—American Mammee Tree—Asiatic Mammee Tree.

Mangifero, Mango Tree.

Melastoma, American Gooseberry.

Melia, Bead Tree—Evergreen Bead Tree of Ceylon—Azadirachta, or Indian Bead Tree.

Musa, Plantain Tree; all the three species.

Myrtus, Myrtle Tree—Pimento, or All-spice Tree—Dioecious Myrtle—Brasilian Myrtle, &c.

Parkinsonia, Parkinsonia.

Physalis, Winter Cherry.

Robinia, False Acacia—Violet American Robinia—Smooth Indian Robinia.

Sapindus, Soap-berry Tree.

Swietenia, Mahogany Tree.

Tamarindus, Tamarind Tree.

Theobroma, Chocolate-nut Tree—Cocoa, or Chocolate-nut Tree—Gauzuma, or Bastard Cedar of Jamaica.

Tinus, several species.

Toluifera, Balsam of Tolu Tree.
Ximenia, American Prickly Ximenia—Unarmed Jamaica Ximenia.
Zamia, Dwarf American Palm. (Frondose.)

SHRUBBY KINDS.

Abrus, Jamaica Wild Liquorice.
Amyris, Sweet Wood.
Apocynum, Dog's Bane—Shrubby Upright Ceylon Apocynum, with varieties—Climbing Dog's Bane, with varieties.
Banisteria, several species.
Bauhinia, Mountain Ebony—Prickly Bauhinia—Tomentose Bauhinia.
Begonia, Shining-leaved.
Bellonia, Rough-leaved.
Bixa, Dyeing Metella, &c.
Bocconia, Tree Celandine.
Bontia, Barbadoes Wild Olive.
Brunia, several species, either for the stove or greenhouse.
Brunsfelsia, Brunsfelsia.
Buddleia, American Buddleia—Occidental Buddleia.
Camellia, Japan Rose.
Capparis, Caper Bush.
Capsicum, Guinea Pepper—Shrubby Capsicum, with many varieties.
Catesbea, Lily Thorn.
Ceanothus, New Jersey Tea—Asiatic Ceanothus.
Celastrus, Staff Tree; two or three species for stove or green-house.
Cestrum, Bastard Jasmine, or Jasminoide.
Citharexylon, Fiddle Wood.
Cliffortia, three species, for stove or greenhouse.
Clitoria, three species.
Cluytia, Elutaria, or Indian Cluytia.
Coccoloba, Sea-side Grape.
Coffea, Coffee Tree.
Crotalaria, Laburnum-leaved.
Dracontium, Dragons.
Ehretia, two or three species.
Elæocarpus, one species.
Eriocephalus, three species, for the stove or green-house.
Erythrina, Coral Tree—Corallodendron, or Smooth Coral Tree—Spinous Coral Tree.
Gossypium, Cotton-plant; consists of herbaceous and shrubby species. See GOSSYPIUM.
Grewia, Oriental Grewia.
Heliotropium, Turnsole.
Hibiscus, Syrian Mallow—Mutable-flowered Hibiscus, or China Rose—Rosa Sinensis, or Rose of China—Viscous Mallow, or Scarlet Hibiscus.
Indigofera, Indigo.
Ixora, Indian Wild Jasmine.
Lantana, American Viburnum—Trifoliate Lantana—Involucrum-headed Lantana—Camara, or Leafless-headed Lantana—Prickly Lantana.
Lawsonia, Lawsonia.
Lobelia, Cardinal-flower—Plumier's Lobelia—Surinam Lobelia—Pine-leaved Lobelia.
Loranthus, Loranthus.
Mesua, Indian Rose Chesnut.
Mimosa, Sensitive Plant. All the species.
Nerium, Oleander — Double-flowered — Striped-leaved.
Nyctanthes, Arabian Jasmine—Sambac, or Common Arabian Jasmine—Undulate-leaved Nyctanthes, or Malabar Jasmine—Arbor Tristis, or Sorrowful Tree—Hairy Sorrowful Tree.
Ophioxylon, Climbing Ophioxylon.
Panax, Genseng.
Pentapetes, Shrubby Pentapetes.
Phyllanthus, Sea-side Laurel.
Phytolacca, American Nightshade.
Piscidia, two species.
Poinciana, Barbadoes Flower Fence, &c.—Fair Poinciana, or Double-spined Barbadoes Flower Fence—Bijugated Single-spined Poinciana—Spineless Poinciana.
Portulaca, Purslane.
Ptelea, Shrubby Trefoil, Viscous Indian Ptelea.
Randia, two species.
Rauwolfia, Rauwolfia.
Rhamnus, Buckthorn—Spina Christi, or Æthiopian Jujube—Œnoplia, or Ceylon Jujube.
Rhus, Sumach—Cobbe, or Ceylon Sumach.
Sideroxylon, Iron Wood—Inermous or Smooth Æthiopian Sideroxylon—Spinous Malabar Sideroxylon.
Solanum, Nightshade—Guinea Nightshade—Fiery-thorned Nightshade—Bahama Nightshade—Trilobate Nightshade, &c.
Sophora, Sophora.
Spothelia, Spothelia.
Tabernæmontana, Tabernæmontana.
Tournefortia, Shrubby Tournefortia—Volubilate or Twining Tournefortia—Fœtid or Stinking Tournefortia—Hairy Tournefortia—Serrated Tournefortia—Cymose Tournefortia.
Vinca, Periwinkle—Rose Periwinkle of Madagascar.
Vitis, Vine—Indian Wild Vine—Trifoliate Indian Vine.

UNDER-SHRUBBY KINDS.

Acanthus, Bear's Breech—Shrubby Holly-leaved Acanthus.
Volkameria, Prickly Volkameria—Unarmed or Smooth Volkameria.

HERBACEOUS KINDS.

Achyranthes, Bloody or Red Indian Achyranthes—Woolly-cupped Indian Achyranthes.

Alstræmeria, two or three species.

Amaryllis, Lily Daffodil—Jacobæan Lily—Mexican Lily—Zilon Lily.

Amomum, Ginger—Common Ginger—Broad-leaved Wild Ginger, &c.

Arum, Wake-Robin, &c.—Ægyptian Arum, or Colocasia.

Asclepias, Swallowwort—American Scarlet Asclepias, &c.

Barleria, several species.

Basella, Malabar Nightshade—Red Malabar Nightshade—White Malabar Nightshade.

Bromelia, Ananas Pine Apple—Common Ananas, or Pine Apple—Wild Pine Apple, or Pinguin—Korates, or Acaulous Wild Pine Apple—Pyramidal Bromelia—Linguated Bromelia.

Browalia, Spreading, Upright.

Calceolaria, Slipper-Wort.

Erythrina, Herbaceous.

Ferraria, Waved-leaved.

Gloriosa, Superb Lily.

Hæmanthus, Blood-Flower—Scarlet Hæmanthus—Radish Hæmanthus—Carinated Hæmanthus—Ciliated Hæmanthus.

Helicenia, Bastard Plantain.

Hydrangea, Great-flowered.

Kæmpferia, Galangale; both the species.

Maranta, Indian Arrow Root—Arundinaceous Maranta—Galanga, or Indian Arrow Root.

Martynia, Perennial Martynia.

Mesembryanthemum, (ficoides) Fig Marigold—Diamond Ficoides, or Ice Plant.

Pandanus, Screw Pine.

Petiveria, Guinea-hen Weed.

Piper, Pepper; several sorts.

Polyanthes, Tuberose, or Indian Tuberous Hyacinth.

Saccharum, Sugar Cane—Common Sugar Cane—Spiked Sugar Cane.

Senecio, Senecio.

Sida, Indian Mallow.

Tulbagia, Tulbagia.

Verbena, Vervain.

Xylophylla, Love-Flower.

WOODY KINDS.

Æschynomene, Bastard Sensitive Plant—Tree Æschynomene—Grandiflorous Æschynomene—Sesban, or Ægyptian Æschynomene.

Areca, Faufel Nut Palm.

Arundo, Reed—Bamboo Cane, or Indian Tree Reed.

Caryophyllus, Clove Tree.

Chrysophyllum, Goldy-leaf, or Star Apple.

Elæagnus, Wild Olive, or Oleaster—Thorny Elæagnus.

Hura, Saud Box Tree.

Jatropha, Cassada, or Cassava Plant. Most of the species are stove plants.

Justicia, Malabar Nut—Hyssop-leaved Justicia, &c.

Malpighia, Barbadoes Cherry. All the species.

Passiflora, Passion Flower—Sawed-leaved Passion Flower—Laurus-leaved Passion Flower—Vespertilious, or Bat's Wing Passion Flower—Red Passion Flower—Maliformous, or Apple-fruited Passion Flower—Silky Passion Flower—Multiferous Passion Flower—Quadranguiar Passion Flower—Suberous, or Cork-barked Passion Flower.

Pisonia; two species.

Plumbago, Lead-Wort—Ceylon Plumbago—Rose Plumbago.

Plumeria, Red Jasmine—Red Plumeria—White Plumeria—Obtuse Plumeria.

Rivinia, Dwarf Tetrandrous Rivinia—Climbing Octandrous Rivinia.

Rondeletia, Rondeletia.

Schinus, Indian Mastic Tree—Melle Tree of Clusius, or Peruvian Mastic Tree—Areira, or Brasilian Mastic Tree.

Triumfella, Lappula, or Berry-capsuled Triumfella.

Urena, Angular-leaved Urena—Sinuated Urena—Procumbent Urena.

Woltheria, American Waltheria—Indian Waltheria—Narrow-leaved Waltheria.

SUCCULENT KINDS.

Agave, American Aloe—Viviparous American Aloe—Stinking American Aloe.

Aletris, Guinea Aloe—Hyacinth-flowered Aletris—Ceylon Aletris—Cape Aletris—Fragrant Aletris.

Aloe, African Aloe. Most of the species, except the Aloe uvaria, may be considered both as greenhouse and stove plants; for, although they may all be wintered tolerably well in a greenhouse, yet, if placed in the stove, in winter particularly, they more certainly flower annually in greater perfection.

Cactus, Melon Thistle, Torch Thistle, &c.—Greater Hedge-hog Melon Thistle, with varieties—Mammillary or Smaller Melon Thistle—Torch Thistle; several upright sorts—Creeping Cereus, or Trailing Torch Thistle—Climbing Creeping Cereus—Ficus Indica, or Indian Fig—Greater Indian Fig—Cochineal Indian Fig—Indian Fig of Curassoa—Sword-leaved Opuntia—Pereskia, or American Gooseberry.

Cotyledon, Navelwort—Cut or Jagged leaved Cotyledon.

Crassula, Lesser Orpine.

Euphorbia, Burning Thorny Plant—Euphorbia of the Antients—Canary Euphorbia—Oleander-

leaved Euphorbia—Medusa's Head Euphorbia—Tithymeloid Euphorbia, or Bastard Spurge.

Gloxinia, one species.

Stapelia, Variegated Stapelia—Hairy Stapelia.

BULBOUS KINDS.

Antholyza, Æthiopian Corn Flag; several species.

Crinum, Asphodel Lily—American Asphodel Lily—Asiatic Asphodel Lily.

Limodorum, Limodorum.

Massonia, Broad-leaved—Narrow-leaved.

Pancratium, (Pancratium Lily) Sea Daffodil—Ceylon Uniflorous Pancratium—Mexican Biflorous Pancratium—Caribbæan Multiflorous Pancratium—Amboyna Broad-leaved Pancratium.

Some of these sorts of plants are also inserted in the green-house list; as, where there is no stove, they may be preserved tolerably well in a good greenhouse.

STRAWBERRY. See FRAGARIA.

STRAWBERRY BLITE. See BLITUM.

STRAWBERRY SPINACH. See BLITUM.

STRAWBERRY TREE. See ARBUTUS.

STRELITZIA, a genus affording a plant of the herbaceous exotic perennial kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Scitamineæ*.

The characters are: that the calyx is an universal spathe, terminating, one-leafed, channelled, acuminate, from spreading declining, many-flowered, involving the base of the flowers; partial spathes lanceolate, shorter than the flowers: perianth none: the corolla is irregular: petals three, lanceolate, acute; the lowest boat-shaped; the two upper bluntly keeled: nectary three-leaved: the two lower leaflets a little shorter than the petals, from a broad base awl-shaped, waved at the edge, folded together, including the genitals, towards the tip behind augmented with a thick appendix, in form of half an arrow head; the lowest leaflet short, ovate, compressed, keeled: the stamina have five filaments, filiform, placed on the receptacle: three in one leaflet of the nectary; two with the style inclosed in the other leaflet: anthers linear, erect, commonly longer than the filaments, included: the pistillum is an inferior germ, oblong, obtusely three-cornered: style filiform, length of the stamens: stigmas three, awl-shaped, higher than the petals, erect, at the beginning of flowering time glued together: the pericarpium is a subcoriaceous capsule, oblong, obtuse, indistinctly three-cornered, three-celled, three-valved: the seeds numerous, adhering in a double row to the central receptacle.

The species is *S. Reginæ*, Canna-leaved Strelitzia.

It has all the leaves radical, petioled, oblong, quite entire, with the margin at bottom waved and curled, very smooth, glaucous beneath, coriaceous, a foot long, permanent: the petioles somewhat compressed, three feet long and more, the thickness of the thumb, sheathing, erect, smooth: the scape the length and thickness of the petioles, erect, round, covered with alternate, remote, acuminate sheaths, green with a purple margin: the general spathe a span long, green on the outside, purple at the edge; partial spathes whitish: the petals yellow, four inches long: the nectary blue: according to Curtis, the spathe contains about six or eight flowers, which becoming vertical as they spring forth, form a kind of crest, which the glowing orange of the corolla, and fine azure of the nectary, render truly superb. A native of the Cape.

Culture.—These plants are raised from seeds, brought from their native situation, and sown in pots of good fine mould, plunged in a hot-bed to get them up; the plants when of some growth should be removed into separate pots, and be replunged in the tan-pit of the stove; afterwards, when the plants are large, they should have plenty of mould, that the roots may be extended into the rotten tan, and in that way render them more strong for blowing their flowers: it may likewise sometimes be raised from the roots, when they are suffered to strike in the above manner; it is said to succeed best in the dry stove and conservatory.

It is highly ornamental among stove plants.

STUARTIA, a genus furnishing a plant of the hardy deciduous flowering shrubby kind.

It belongs to the class and order *Monadelphia Polyandria*, and ranks in the natural order of *Columniferæ*.

The characters are: that the calyx is a one-leafed perianth, half-five-cleft, spreading; segments ovate, concave, permanent: the corolla has five petals, obovate, spreading, equal, large: the stamina have numerous filaments, filiform, united into a cylinder below, shorter than the corolla, connecting the petals at the base: anthers roundish, incumbent: the pistillum is a roundish germ, hirsute: style simple, filiform, length of the stamens: stigma five-cleft: the pericarpium is a juiceless pome, five-lobed, five-celled, soluble into five closed parts: the seeds solitary, ovate, compressed.

The species cultivated is *S. Malacodendron*, the Malacodendron.

It is a shrub, rising with strong ligneous stalks to the height of ten or twelve feet, sending out branches on every side covered with a brown bark, and garnished with oval spear-shaped leaves, about two inches and a half broad, sawed

on the edges, pretty much veined, and stand alternately: the flowers are produced from the wings of the stalk; they are white, with one of the segments of a yellowish tinge: it flowers in the latter end of May. It grows naturally in Virginia.

Culture.—This plant may be increased by seeds, layers, and occasionally by cuttings: the seeds should be procured from abroad, and sown in pots, filled with light earth, in the early spring, plunging them in a good hot-bed, watering them well now; and when the plants are up protecting them under frames, or in the green-house, for two or three winters, and hardening them in the summer, then putting them into small pots separately, in the spring placing them in the hot-bed till fresh rooted, watering them occasionally, and giving proper shade till fresh rooted, then hardening them for the summer, but protecting them in the following winter: then in the spring following, when the weather is fine and settled, turning them out with balls about their roots into the open ground, placing them in a warm situation. The young shoots may be laid down early in the autumn, in the slit method, watering them frequently in the following spring and summer, and shading them from excessive heat: when well rooted, in the following spring they may be taken off and planted out in separate pots, plunging them in a hot-bed till they have taken fresh roots, when they should be managed as the others.

The cuttings of the young shoots should be planted out in the spring, in pots of fine light mould, plunging them in a hot-bed; and when they have stricken good roots they may be removed into separate pots and managed as the others.

These plants afford ornament and variety in shrubberies, and among potted plants.

STYRAX, a genus furnishing an aromatic deciduous tree of the exotic kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a one-leafed perianth, cylindric, erect, short, five-toothed: the corolla one-petalled, funnel-form: tube short, cylindric, length of the calyx: border five-parted, large, spreading; segments lanceolate, obtuse: the stamina have ten filaments, erect, in a ring, scarcely united at the base, awl-shaped, inserted into the corolla: anthers oblong, straight: the pistillum is a superior germ, three-celled, many-seeded: style simple, length of the stamens: stigma truncate: the pericarpium is a roundish drupe, one-celled: the seeds are nuts one or two, roundish, acuminate, convex on one side, flat on the other.

The species is *S. officinale*, Officinal Storax. It rises in its native situation twelve or fourteen feet high: the trunk is covered with a smooth grayish bark, and sends out many slender branches on every side; the leaves about two inches long, and an inch and half broad, of a bright green on their upper side, but hoary on their under; they are entire, and placed alternately on short footstalks: the flowers come out from the side of the branches, upon pedunncles sustaining five or six flowers in a bunch; are white, and appear in June. It is a native of Italy and the Levant.

Culture.—It may be increased by seeds, obtained from abroad, by sowing them in pots of light earth an inch deep; and as they are of a hard stony nature, and rarely come up the first year, the pots should be plunged under a frame during cold weather, and be in the shade in summer, and in the second spring be plunged in a hot-bed to forward them, being careful to give water, and to harden the young plants gradually to the full air in summer, in a shady place during the hot weather, being often watered; and in winter the pots be replaced under a garden-frame, &c., to have shelter from frost; then in spring following let them be potted off separately, and managed as hardy green-house plants for three or four years, when some of them may be turned out into the full ground in a sheltered situation, trained against a south wall, and some may be retained in pots for the green-house collection: they afford ornament and variety in these different situations.

STYRAX. See LIQUIDAMBAR.

SUBER. See QUERCUS.

SUCKERS, such young offspring plants as arise immediately from the roots of older vegetables, and which, being generally furnished also with roots, when transplanted, readily grow, and become proper plants, similar to the mother ones.

They are proper for increasing their kinds by in many cases, and in certain instances a sure method to continue any approved or desirable species or variety; but in grafted and budded trees, the suckers partake only of the nature of the stock.

Some sorts of trees furnish plenty every summer, which are often furnished with root-fibres, affording proper plants for setting out in one season, and of course become a ready means of increase: in trees, &c., that are wholly the same sort, root and top, they prove the same invariably in every mode of growth, as certainly as by layers, cuttings, grafting, &c.

The season for taking up or transplanting suckers of trees and shrubs, is almost any time, in open weather, from October till March, being careful to dig them up from the mother plant with as much root-fibres as possible, and trim-

ming them ready for planting, by shortening the long straggling fibres, and cutting off any thick-knobbed part of the old root that may adhere to the bottom, leaving only the fibres arising from the young wood; though it is probable some will appear with hardly any fibres; but as the bottom part having been under ground, and contiguous to the root of the main plant, is naturally disposed to send forth fibres for rooting, preparatory to planting them out, the stems of the shrub and tree suckers should likewise be trimmed occasionally, by cutting off all lower laterals; and any having long, slender, and weak tops, or such as are intended to assume a more dwarfish or bushy growth, may be shortened at top in proportion, to from about half a foot to one or two feet in length, according to their nature or strength; and others that are more strong, or that are designed to run up with taller stems, may have their tops left entire, or shortened but little: when thus taken up and trimmed, they should be planted out in rows in the nursery; the weak suckers separately in close rows; and also the shortened and stronger plants each separately in wider rows; so that the rows may be from one to two feet asunder, in proportion to the size and strength of the suckers: and after being thus planted out, they should have the common nursery culture of cleaning from weeds in summer, and digging the ground between the rows in winter, &c., and in from one to two or three years they will be a proper size for planting out where they are to remain: and some kinds of trees, &c., produce suckers strong enough in one season to be fit for planting where they are to remain; as some sorts of roses, and numerous other flowering shrubs; also some of the strong shooting gooseberries, currants, raspberries, &c.

The increase by suckers, as in some particular sorts of trees and shrubs, as currants and gooseberries, &c., is objected to for any general supply, on the supposition that the trees so raised are more adapted to run too greatly to suckers, and overrun the ground round the mother plant, than such as are raised by other methods: however, it may generally be observed of such trees and shrubs as are naturally disposed to send up many suckers, that by whatsoever method they are propagated, whether by seeds, suckers, layers, cuttings, &c., they commonly still continue their natural tendency.

When it is therefore required to have any sorts produce as few suckers as possible, not to overrun the ground, or disfigure the plants, it is proper both at the time of separating the suckers, or planting them off from the main plants, and at the time of their final removal from the nursery, to observe if at the bottom part they show any tendency to emit suckers, by the appearance of prominent buds, which, if the case, should all be rubbed off as close as possible: as, however, many sorts of trees and shrubs are liable to throw out considerably more than may be wanted, they should always be cleared away annually at least, and in such as are not wanted for increase, it is proper to eradicate them constantly, as they are produced in spring and summer.

Numerous herbaceous and succulent plants are productive of bottom off-set suckers from the roots, by which they may be increased, either generally or occasionally, according to the different sorts, both of the fibrous-, bulbous-, and tuberous-rooted tribes; all the off-sets from the root, and above-ground bottom side heads, of these kind of plants, may be deemed a sort of suckers: those for planting should be taken off when of one summer's growth, or two at most, which, in the fibrous-rooted kind, may be performed in autumn or spring; and in the bulbous-, and many of the tuberous-rooted sorts, in summer and autumn, when the stalks and leaves decay.

In slipping and planting these sorts of off-set suckers, the smaller ones should be planted in nursery-beds, pots, &c., according to the nature of growth and temperature of the different sorts, to have the advantage of one summer's advanced growth; and the larger ones at once, where they are to remain, in beds, borders, pots, &c., according to the sorts.

SUGAR CANE. See Saccharum.

SUGAR MAPLE. See Acer.

SULTAN, SWEET. See Centaurea.

SUMACH. See Coriaria and Rhus.

SUMMER CYPRESS. See Chenopodium.

SUN, the luminary that affords light and heat to plants and vegetables, and is the first mover of all their actions; by the genial heat which it affords, and its influence upon the soils, it promotes the growth of them all.

Plants, therefore, which in their growth are more or less exposed to the sun, are, for the most part, more prosperous, forwarder, and attain greater perfection than such as grow in any considerable shade: and most fruits in a sunny exposure are considerably more beautiful, sooner ripe, and acquire superior quality in flavour, &c. to those growing in shady places: and as it has a highly fertilizing effect upon the earth, the ground designed to be mellowed should always be turned up in rough ridges, to give free access to the influence of the sun and air; likewise all compost heaps should generally be prepared in sunny situations, in the full air, not in shady corners, or in sheds, as is often practised by gardeners.

SUN-DEW. See DROSERA.
SUN-FLOWER. See HELIANTHUS.
SUN-SPURGE. See EUPHORBIA.
SWALLOW-WORT. See ASCLEPIAS.
SWEET APPLE. See ANNONA.
SWEET BRIER. See ROSA.
SWEET FLAG. See ACORUS.
SWEET GUM. See LIQUIDAMBAR.
SWEET JOHNS. See DIANTHUS.
SWEET MAUDLIN. See ACHILLEA.
SWEET PEA. See LATHYRUS.
SWEET RUSH. See ACORUS.
SWEET SOP. See ANNONA.
SWEET SULTAN. See CENTAUREA.
SWEET WEED. See CAPRARIA and SCOPARIA.
SWEET WILLIAM. See DIANTHUS.
SWEET WILLOW. See MYRICA.

SWIETENIA, a genus furnishing a plant of the exotic tree kind for the stove.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Trihilatæ*.

The characters are: that the calyx is a one-leafed perianth, five-cleft, obtuse, very small, deciduous: the corolla has five petals, obovate, obtuse, concave, spreading: nectary one-leafed, cylindric, length of the petals, mouth ten-toothed: the stamina have ten filaments, very small, inserted below the teeth of the nectary: anthers oblong, erect: the pistillum is an ovate germ: style awl-shaped, erect, length of the nectary: stigma headed, flat: the pericarpium is an ovate capsule, large, woody, one-celled, at the top five-celled, five-valved, valves opening at the base: the seeds very many, imbricate, compressed, oblong, obtuse, having a leafy wing: receptacle large, five-cornered.

The species cultivated is *S. Mahagoni*, Mahogany Tree.

In its native state it is a lofty and very branching tree, with a wide handsome head; the leaves reclining, alternate, shining, eight inches long, numerous on the younger branches: leaflets for the most part four pairs, but often three, seldom five, without any odd one, falcate-lanceolate, quite entire, acuminate, bent in backwards, petioled, opposite, an inch and half long: the racemes subcorymbed, with about eight flowers in each, axillary, solitary, two inches long; the flowers are small, whitish; the capsule large, (sometimes attaining the size of a child's head,) woody, ovate, of a smoky-rufescent colour (or ferruginous), towards the top five-celled, but in other parts widely one-celled, five-valved: valves thick, opening from the base, caducous, covered within by a thick flexile coriaceous lamina, exactly equal to them in size. A native of the warmest parts of America, &c.

Culture.—This plant may be increased by sowing the seeds obtained from abroad in small pots, filled with light sandy mould, in the spring, plunging them in a hot bed, and watering them occasionally: when the plants are a few inches high, they should be carefully removed into other pots separately, replunging them in the hot-bed, giving them shade till re-rooted; they should afterwards have the management of other stove plants. They afford variety and curiosity in stove collections.

SYMPHYTUM, a genus containing plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Asperifoliæ*.

The characters are: that the calyx is a five-parted perianth, erect, five-cornered, acute, permanent: the corolla one-petalled, bell-shaped: tube very short: border tubular-bellying, a little thicker than the tube: mouth five-toothed, obtuse, reflexed: throat fenced by five lanceolate rays, spinulose at the edge, shorter than the border, converging into a cone: the stamina have five awl-shaped filaments, alternate with the rays of the throat; anthers acute, erect, covered; the pistillum is as four germs: style filiform, length of the corolla: stigma simple: there is no pericarpium: calyx larger, widened: seeds four, gibbous, acuminate, converging at the tips.

The species cultivated are: 1. *S. officinale*, Common Comfrey: 2. *S. tuberosum*, Tuberous-rooted Comfrey, 3. *S. orientale*, Oriental Comfrey.

The first has a perennial root, fleshy, externally black; the stem two or three feet high, upright, leafy, winged, branched at the top, clothed with short bristly hairs that point rather downward: the leaves waved, pointed, veiny, rough; the radical ones on footstalks, and broader than the rest; the clusters of flowers in pairs on a common stalk, with an odd flower between them, recurved, dense, hairy: the corolla yellowish-white, sometimes purple: the rays downy at each edge. It is a native of Europe and Siberia.

There are varieties with white flowers, purple flowers, with blue flowers, and with red flowers.

The second species has the roots composed of many thick fleshy knobs or tubers, which are joined by fleshy fibres: the stalks rise a foot and half high, and incline on one side: the leaves on the lower part are six inches long, and two inches and a half broad in the middle, ending in acute points, and not so rough and hairy as the first; they are alternate and sessile: the two upper leaves on every branch stand opposite, and just above them are loose bunches of pale yellow flowers, the corolla of which is stretched out further beyond the calyx than in the com-

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1 *Syringa vulgaris.* Lilac.

2 *Sarracena flava.* Yellow Sarracena

Painted by Syd. Edwards London Published July 1st 1806 by G. Kearsley Fleet Street Engraved by F. Sansom

1 *Symphytum orientale*
Eastern Comfrey

2 *Salvia indica.*
Indian Sage

mon sort. It is a native of Germany, &c., and flowers from May to October.

The third has a perennial root: the stalks two feet high: the leaves rounder, and armed with rough prickly hairs: the flowers in bunches like the first sort, but blue: they appear in March, but seldom produce seeds in this climate. Found near Constantinople.

Culture.—These plants may be increased by seeds or parting the roots, but the latter is more practised. The seeds should be sown in the spring, in a border of common earth; in the autumn the plants will be proper to set out where they are to remain, or to remove into other pots. The roots should be parted in the autumn, and planted out either in beds about a foot from plant to plant, or where they are to remain; almost every part will grow, and the plants are hardy, and succeed in any soil or situation: they only require to be kept clean afterwards. They produce variety in mixture in the borders.

SYRINGA, a genus containing plants of the deciduous flowering shrubby kind.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Sepiariæ*.

The characters are: that the calyx is a one-leafed perianth, tubular, small: mouth four-toothed, erect, permanent: the corolla one-petalled, funnel-form: tube cylindric, very long: border four-parted, spreading and rolled back: segments linear, obtuse: the stamina have two filaments, very short: anthers small, within the tube of the corolla: the pistillum is an oblong germ: style filiform, length of the stamens: stigma bifid, thickish: the pericarpium is an oblong capsule, compressed, acuminate, two-celled, two-valved: valves contrary to the partition: the seeds solitary, oblong, compressed, acuminate at both ends, with a membranaceous edge.

The species cultivated are: 1. *S. vulgaris*, Common Lilac: 2. *S. Persica*, Persian Lilac.

The first is a shrub, which grows to the height of eighteen or twenty feet in good ground, and divides into many branches; those of the White sort grow more erect than the Blue; and the Purple or Scotch Lilac has its branches yet more diffused. The branches of the White are covered with a smooth bark of a gray colour; in the other two it is darker; the leaves of the White are of a brighter green; they are heart-shaped in all, almost five inches long, and three inches and a half broad near the base, placed opposite, on foot-stalks an inch and half in length. The buds of the future shoots, which are very turgid before the leaves fall, are of a very bright green in the White sort, but those of the other two are dark green. The flowers are always produced at the ends of the shoots of the former year; and below the flowers other shoots come out to succeed them; as that part upon which the flowers stand decays down to the shoots below every winter. There are generally two bunches or panicles of flowers joined at the end of each shoot; those of the Blue are the smallest, the flowers also are smaller, and placed thinner than either of the others; the bunches on the White are larger, but those of the Scotch are larger still, and the flowers fairer; it of course makes the best appearance: the panicles of flowers grow erect, and, being intermixed with the bright green leaves, have a fine effect, which with the fragrancy of the flowers, renders it one of the most beautiful shrubs of the garden: the flowers appear early in May, or towards the end of April, and when the season is cool continue three weeks; but in hot seasons soon fade. It is supposed a native of Persia.

There are several varieties: as with white flowers, with blue flowers, with purple flowers, or Scotch Lilac.

The second species is a shrub of much lower growth than the common sort, seldom rising more than five or six feet high: the stems are covered with a smooth brown bark: the branches are slender, pliable, extend wide on every side, and frequently bend down where they are not supported: the leaves two inches and a half long, and three fourths of an inch broad, of a deep green colour: the flowers in large panicles at the end of the former year's shoots, as in the former; of a pale blue colour, and having a very agreeable odour. They appear at the end of May, soon after those of the common sort, and continue longer in beauty, but do not perfect their seeds in this climate.

There are several varieties: as the common purple-flowered, white-flowered, blue-flowered, and the laciniated or cut-leaved.

Culture.—These plants are mostly raised by suckers or layers, and sometimes by seeds. The suckers should be taken off in the autumn or spring, with root-fibres to them, and be planted out either in nursery-rows, to remain a year or two, or where they are to remain. Tthe layers may be made from the young pliant shoots, and be laid down in the autumn, in the usual way, when in the autumn following they may be taken off and planted out, as in the suckers. The first sort may likewise be raised from seeds sown in a bed of common earth, in the autumn or spring, keeping the plants clean when they come up. They afford variety in the large borders and other parts of shrubberies.

TABERNÆMONTANA, a genus containing plants of the woody exotic and hardy perennial kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Contortæ*.

The characters are: that the calyx is a five-cleft perianth, acute, converging, very small: the corolla one-petalled, funnel-form; tube cylindric, long; border five-parted, flat; segments obtuse, oblique: nectary glands five, bifid, standing round the germ: the stamina have five filaments, very small, from the middle of the tube: anthers converging: the pistillum has two simple germs; style awl-shaped; stigma oblong, headed: the pericarpium has two follicles, horizontally reflexed, ventricose, acuminate, one-celled, one-valved: the seeds numerous, ovate-oblong, obtuse, wrinkled, immersed in pulp, imbricate.

The species cultivated are: 1. *T. citrifolia*, Citron-leaved Tabernæmontana; 2. *T. laurifolia*, Laurel-leaved Tabernæmontana; 3. *T. Amsonia*, Virginian Tabernæmontana; 4. *T. angustifolia*, Narrow-leaved Tabernæmontana.

The first rises with an upright woody stalk, to the height of fifteen or sixteen feet, covered with a smooth gray bark, abounding with a milky juice, and sending out several branches from the side, which grow erect, and have many joints: the leaves are thick, milky, from five to six inches long, and two inches broad in the middle, drawing to a point at each end; they are of a lucid green, have many transverse veins, and stand opposite on footstalks an inch long: the flowers come out in roundish axillary bunches; they are small, of a bright yellow colour, and have an agreeable odour. It is a native of Jamaica, Martinico, &c.

The second species rises with a shrubby stalk twelve or fourteen feet high, sending out a few branches towards the top, which grow erect: the leaves are four inches long and two broad, of a lucid green colour: the flowers are produced in a sort of umbel from the side of the branches; are small, yellow, and have an agreeable odour. It is a native of Jamaica, St. Domingo, &c.

The third is a perennial plant, sending up in the spring two or three herbaceous stalks near a foot high: the flowers are produced in small terminating bunches, white and void of scent. It is a native of North America, flowering in May and June.

The fourth species is a perennial plant, native of North America, flowering in May and June.

Culture.—These plants may be increased by seeds, which must be procured from the countries where the plants grow naturally, and be sown early in the spring on a hot-bed; and when the plants are come up, and fit to remove, be carefully planted out into small pots filled with light rich earth, and then plunged into a hot-bed of tanner's bark, being careful to shade them in the heat of the day until they have taken new root; after which they should have free air admitted to them every day when the weather is warm; but on cold nights have the glasses of the hot-bed covered with mats every evening, soon after the sun goes off from the bed: they must be often refreshed with water, but not in large quantities, especially while they are young, as they are full of a milky juice, and are subject to rot with much moisture: they may remain during the summer season in the hot-bed, by stirring up the tan to renew the heat when it wants, and a little new tan being added; but when the nights begin to be cold, the plants should be removed, and plunged into the bark-bed in the stove, where, during the winter season, they must be kept in a moderate degree of warmth, and in cold weather have but little water given them: they should constantly remain in the stove, where, in warm weather, they may have free air admitted to them by opening the glasses, but in cold weather be kept warm. With this management they thrive and produce flowers; and, as their leaves are always green, make a pleasant diversity among other tender exotic plants: they may be increased likewise by cuttings in the summer season, which should be cut off from the old plants, and laid to dry in the stove five or six days before they are planted, that the wounded parts may heal over: these should then be planted in pots filled with fresh light earth, and plunged into the hot-bed of tanner's bark, and closely covered with a hand-glass, shading them from the sun in the middle of the day in hot weather, refreshing them now and then with a little water: when they have taken root, they may be planted out into separate pots, and be treated in the same manner as those raised from seeds.

The third and fourth sorts are capable of living in the open air here, provided they are planted in a warm situation; they love a light soil, rather moist than otherwise; of course, when planted in dry ground, they should be frequently watered

in dry weather. They are increased by off-sets from the roots, which should be planted out in the autumn.

The first two sorts afford variety in the stove, and the latter sorts in this as well as the borders.

TACAMAHACA. See POPULUS.

TAGETES, a genus furnishing plants of the herbaceous annual kind.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Oppositifoliæ*.

The characters are: that the calyx is common, quite simple, one-leafed, tubular, oblong, five-cornered, five-toothed: the corolla compound radiate: corollets hermaphrodite, tubular, many, on an elevated disk: females ligular, five, in the ray:—proper in the hermaphrodites, tubular, half-five-cleft, erect, longer than the calyx, segments linear, inwardly villose:—in the females ligular, longer than in the hermaphrodites, almost equal in length and breadth, very blunt, narrower towards the tube, tomentose, permanent:—the stamina in the hermaphrodites: filaments five, capillary, very short: anther cylindrical, tubular: the pistillum in the hermaphrodites: germ oblong: style filiform, length of the stamens: stigma bifid, slender, reflexed:—in the females germ oblong: style filiform, length of the hermaphrodite: stigma bifid, slender, reflexed: there is no pericarpium: calyx unchanged: the seeds in the hermaphrodites solitary, linear, compressed, a little shorter than the calyx: down with five, erect, acuminate, unequal chaffs.—In the females like the others: the receptacle naked, small, flat.

The species cultivated are: 1. *T. patula*, French Marygold: 2. *T. erecta*, African Marygold.

The first has the stem a foot and half high, almost upright, smooth, diffused: the leaves deeply pinnatifid, (pinnate with a winged rachis) the segments lanceolate, serrate smooth, dark-green, paler at the back, and punched: the flowers solitary, terminating, gold-coloured, on a long upright peduncle. It is probably a native of Mexico, flowering from July to autumn.

There are several varieties: as the pale yellow-flowered, deep yellow-flowered, golden yellow-flowered, crimson-coloured, velvety, variegated crimson and yellow, striped crimson and yellow; each of which has both single and double flowers.

The second species has the stem three or four feet high, straight, round, green, dividing from the middle into many branches, each bearing one large flower: the leaves long, pinnate; leaflets dark-green: the flowers yellow, from brimstone to orange colour. It is a native of Mexico.

There are varieties: as with pale-yellow or brimstone-coloured flowers, with deep yellow flowers, with orange-coloured flowers; each with single, double, and fistulous flowers; the middling African, with orange-coloured flowers, and the sweet-scented African.

Culture.—These plants are increased by seeds, which should be sown in the beginning of April upon a hot-bed, and when the plants appear, they should have plenty of fresh air, and after they have attained some growth be transplanted on to another hot-bed, which is arched over by hoops, at the distance of six inches, watering and shading them well till fresh rooted, being afterward gradually inured to the open air; and about the beginning of May they may be taken up with balls of earth about their roots, and planted in pots, to be set out in the courts, yards, &c., about the house, shading them till fresh rooted, and giving them water occasionally: but the first sort divides and spreads out widely near the ground, in a rambling manner, and requires to be trimmed up at bottom to a single stem, and its branches occasionally, to preserve the head somewhat regular, and within due bounds.

The second species in particular, and the varieties, as they always grow firmly erect, both in stem and branches, require but very little trouble after their final planting out: they afford ornament and variety among other plants, in the borders, clumps, and other parts of pleasure-grounds, as well as in pots for particular places about the house, among other potted annual plants. The seeds of each species, and their varieties, should be annually saved from the best plants.

TALLOW TREE. See CROTON.

TAMARINDUS, a genus containing a plant of the exotic tree kind.

It belongs to the class and order *Monadelphia Triandria*, (*Triandria Monogynia*,) and ranks in the natural order of *Lomentaceæ*.

The characters are: that the calyx is a one-leafed perianth; tube turbinate, compressed, attenuated below, permanent; mouth oblique; border four-parted, deciduous; segments ovate, acute, flattish, reflexed, coloured; the upper and lower a little wider: the corolla has three petals, ovate, concave, acute, crenate, waved, reflexed, length of the calyx, inserted into the mouth of the tube, the two lateral ones a little larger: the stamina have three filaments, inserted into the orifice of the calyx at the void sinus, length of the corolla, awl-shaped, united below up to the middle, bowed towards the corolla: anthers ovate, incumbent, large: threads five (rudiments of stamens), alternate with the filaments, and united below, but separate above,

bristle-shaped, headed, very short; the two lateral ones lower than the others: bristles two, springing from the calyx below the filaments, and incumbent on them, very small: the pistillum is an oblong germ, compressed, curved in, placed on a pedicel fastened to the bottom of the calyx, and growing longitudinally to its tube under the back, beyond the tube, with the upper margin villose: style awl-shaped, ascending, pubescent on the lower margin, a little longer than the stamens: stigma thickened, obtuse: the pericarpium is a legume, oblong, compressed, blunt with a point, swelling at the seeds, covered with a double rind, the outer dry and brittle, the inner membranaceous; a soft pulp between both; one-celled, not opening: the seeds few, angular-roundish, plano-compressed, shining, hard.

The species is *T. Indica*, Tamarind-tree.

It grows to a very large size in the countries where it is a native: the stem is very large, covered with a brown bark, and divides into many branches at the top, spreading wide every way; the leaves pinnate, composed of sixteen or eighteen pairs of leaflets, without a single one at the end; they are about half an inch long, and a sixth part of an inch broad, of a bright green, a little hairy, and sit close to the midrib: the flowers come out from the side of the branches, five, six, or more together, in loose bunches; the pods are thick and compressed; those from the West Indies from two to five inches in length, with two, three, or four seeds; those from the East Indies are almost twice as long, and contain five, six, and even seven seeds. It is a native of both the Indies, &c.

Culture.—This plant is increased from seeds, which should be sown in the spring on a hot-bed, and when the plants are come up, each planted in a separate small pot filled with light rich earth, plunging them into a hot-bed of tanner's bark to bring them forward, watering and shading them until they have taken root; and as the earth in the pots becomes dry, they must be watered from time to time, and have air given in proportion to the warmth of the season, and the bed in which they are placed: when the pots in which they are planted are filled with their roots, the plants should be shifted into pots of a larger size, which must be filled up with rich light earth, and again plunged into the hot-bed, giving them air as before, according to the warmth of the season; but in very hot weather the glasses should be shaded with mats in the heat of the day, otherwise the sun will be too violent for them through the glasses; nor will the plants thrive if they are exposed to the open air, even in the warmest season; so that they must be constantly kept in the bark-stove both summer and winter, treating them in the same manner as the Coffee-tree. These plants have a good effect in the stove collections.

TAMARIX, a genus furnishing plants of the hardy, deciduous, tree, and shrub kinds.

It belongs to the class and order *Pentandria Trigynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is a five-parted perianth, obtuse, erect, permanent, shorter by half than the corolla: the corolla has five petals, ovate, concave, obtuse, spreading: the stamina have five capillary filaments: anthers roundish: the pistillum is an acuminate germ: style none: stigmas three, oblong, revolute, feathered: the pericarpium is an oblong capsule, acuminate, three-sided, longer than the calyx, one-celled, three-valved: the seeds very many, very small, pappose.

The species cultivated are: 1. *T. Gallica*, French Tamarisk; 2. *T. Germanica*, German Tamarisk.

The first in its native situation grows to a tree of middling size, but in this climate seldom more than fourteen or sixteen feet high: the bark is rough, and of a dark brown colour: it sends out many slender branches, most of which spread out flat and hang downward at their ends; these are covered with a chesnut-coloured bark, and garnished with very narrow finely divided leaves, which are smooth, of a bright green colour, and have small leaves or indentures which lie over each other like scales of fish: the flowers are produced in taper spikes at the end of the branches, several of them growing on the same branch: the spikes are about an inch long, and as thick as a large earth-worm: the flowers are set very close all round the spike, are very small, and have five concave petals of a pale flesh colour, with five slender stamina terminated by roundish red anthers: they appear in July. It is a native of the South of France, &c.

The second species is rather a shrub than a tree, having several woody stalks arising from the same root, which grow quite erect, sending out many side branches which are also erect; they have a pale-green bark when young, afterwards changing to a yellowish colour: the leaves are shorter, and set closer together than those of the first sort, and are of a lighter green, approaching to a gray: the flowers are produced in long loose spikes at the end of the branches, standing erect, and are larger than those of the first. It is a native of Germany, &c.

Culture.—These plants may be increased either by laying down their tender shoots in

autumn, or by planting cuttings in an east border, which will take root in a short time, if they are supplied with water in the spring, before they begin to shoot in dry weather; but they should not be removed until the following autumn, at which time they may be either placed in a nursery to be trained up two or three years, or where they are designed to remain, mulching their roots, and watering them according as the season requires, until they have taken root; after which, the only culture they will require, is to prune off the straggling shoots, and keep the ground clean about them.

The layer method is not only tedious but unnecessary, as the cuttings grow readily, and the layers often will not strike at all. The cuttings should be of the last summer's shoots, and a moist border is most proper for them. In two years they will be good plants for the shrubbery, and may be planted out in almost any soil, though they like a light moist earth best, especially the latter sort, which grows naturally in low watery situations.

They are very ornamental in the shrubbery borders, clumps, and other parts of grounds.

TAMUS, a genus furnishing plants of the hardy herbaceous climbing perennial kind.

It belongs to the class and order *Dioecia Hexandria*, and ranks in the natural order of *Sarmentaceæ*.

The characters are: that in the male, the calyx is a six-parted perianth: leaflets ovate-lanceolate, spreading more at top: there is no corolla: the stamina have six simple filaments, shorter than the calyx: anthers erect: female—calyx a one-leafed perianth, six-parted, bell-shaped, spreading: segments lanceolate, superior, deciduous: the corolla petals none: nectaries an oblong point, fastened internally to each calycine segment at the base: the pistillum is an ovate-oblong germ, large, smooth, inferior: style cylindrical, length of the calyx: stigmas three, reflexed, emarginate, acute: the pericarpium is an ovate berry, three-celled: the seeds two, globular.

The species are: 1. *T. Communis*, Common Black Bryony; 2. *T. cretica*, Cretan Black Bryony.

The first has a very large tuberous root, blackish externally, whence its old Latin and English names: the stems smooth, twining about every thing in their way, and thus ascending, without the aid of tendrils, to the height of ten or twelve feet in hedges or among bushes, which their festoons of tawny leaves and red berries decorate in autumn: the leaves alternate, petioled, smooth and shining, quite entire; the nerves raised beneath, varying from kidney- to heart-shaped, heart-spear-shaped, triangular spear-shaped, and even halbert-shaped: the flowers greenish, in long racemes or bunches from the side of the stalks, appearing in June; the barren and fertile ones on separate roots. It is a native of Europe.

The second species has a rounder root than the other; the stalks twine in the same manner; but the principal difference consists in the leaves being divided into three lobes. It was discovered in the island of Crete or Candia.

Culture.—These plants are readily increased by sowing the seeds soon after they are ripe under the shelter of bushes, where, in the spring, the plants will come up, and require no further care; or in beds to be afterwards planted out. The roots will abide many years, and sometimes send up suckers, from which plants may be raised by setting them out in the autumn or spring where they are to remain.

They are useful in thickets and wilderness parts.

TAN. See Bark.

TANACETUM, a genus furnishing plants of the herbaceous and shrubby perennial kinds.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common hemispherical, imbricate: scales acute, compact: the corolla compound tubular, convex: corollets hermaphrodite numerous, tubular, in the disk; females some in the ray: proper of the hermaphrodite funnel-form; with a five-cleft reflexed border: female trifid, more deeply divided inwardly: the stamina in the hermaphrodites: filaments five, capillary very short: anther cylindric, tubular: the pistillum in the hermaphrodites germ oblong, small: style filiform, length of the stamens: stigma bifid, revolute; in the females germ oblong: style simple: stigmas two, reflexed: there is no pericarpium: calyx unchanged: the seeds solitary, oblong: down slightly margined: the receptacle convex, naked.

The species cultivated are: 1. *T. vulgare*, Common Tansy; 2. *T. annuum*, Annual Tansy; 3. *T. Balsamita*, Cost-mary; 4. *T. Sibiricum*, Siberian Tansy; 5. *T. suffruticosum*, Shrubby Tansy; 6. *T. flabelliforme*, Fan-leaved Tansy.

The first has a fibrous creeping root, which will spread to a great distance: the herb is bitter, and has a strong aromatic smell: the stems upright, two feet high, (in a garden from two to almost four feet,) leafy, round, striated, scarcely hairy: the leaves alternate, deep green, acutely cut, smooth, or somewhat hairy beneath, eared at the base, embracing: pinnules lanceolate deeply and acutely serrate: the flowers are in

terminating corymbs, of a golden colour and flattish. It is a native of Europe and Siberia, flowering from June to August.

There are varieties with curled leaves, called Double Tansy; with variegated leaves; and with larger leaves, which have little scent.

The second species is an annual plant, rising about two feet high: the stem stiff, but herbaceous, sending out many side branches their whole length; the lower ones four or five inches long, gradually shorter to the top: the leaves come out in small clusters from the joints; they are very narrow and short; some end in three points, others are single: the branches are terminated by clusters of flowers of a bright yellow; each corymb on a short peduncle. They appear in July or August, and continue till the frost destroys them. It has a fine aromatic scent, and is a native of Spain and Italy.

The third has a hardy root, fleshy and creeping: the lower leaves near three inches long, and an inch and half broad, of a grayish colour, and on long footstalks: the stems rise from two to three feet high, and send out branches from the side: the leaves on these are like the lower ones, but smaller and sessile: the flowers are produced at the top of the stems in a loose corymb; they are naked, and of a deep yellow colour, appearing in August. The whole plant has a soft pleasant odour. It is a native of the South of France, Spain, and Italy.

The fourth species has the leaves linear, pinnate: pinnas linear, filiform, often bifid or trifid, quite entire: the corymb terminating and others axillary, few-flowered; flowers yellow: the root is fibrous perennial: the stalks more than two feet high. It flowers in June and July, and is a native of Siberia.

The fifth species rises with a branching shrubby stalk, three or four feet high: the segments of the leaves are very narrow, and frequently cut into acute segments: the flowers are produced in small roundish bunches, at the ends of the branches, of a bright yellow, and appear in August. It is a native of the Cape.

The sixth species has all the florets hermaphrodite and five-cleft: the receptacle naked, not chaffy. It is a native of the Cape, flowering from May to August.

Culture.—The different herbaceous species are increased by parting the roots, and by seed.

In the first mode the business is effected by slipping or dividing the roots in autumn or winter, when the stalks are decayed; or early in spring, before new stalks shoot forth, planting the slips at once where they are to remain; those for the kitchen-garden, as the Common Tansy, &c. in any bed or border a foot and a half asunder; and those intended for variety in the pleasure-ground, singly here and there, at suitable distances, to effect a proper diversity.

The seed saved in autumn should be sown in the spring following, in beds of light earth, broad-cast and raked in, when the plants will soon come up, and in July be fit to prick out in beds, in rows a foot asunder; some to remain, and others to be planted out in autumn where they are to grow.

The shrubby sorts are easily increased by cuttings of the branches, which should be planted any time in spring and summer, choosing the young and most robust shoots, which should be cut off in proper lengths; and if early in spring, &c. be planted in pots of good earth, several in each, plunging them in a hot-bed, where they will be rooted, and fit for potting off separately in six weeks; or, if in summer, the young shoots may be planted in the full ground, in a shady border, or where they may be shaded with mats from the sun; or in pots, and placed in the shade, or under a garden frame, &c.; in all of which methods, giving plenty of water, they will readily take root; but those in the hot-bed will be forwardest: they however will all be well rooted the same season, and should then be transplanted in separate pots, and managed as other shrubby green-house plants. See GREEN-HOUSE PLANTS.

The former sorts require to be afterwards kept free from weeds, cutting down the decayed stalks annually in autumn; and as the roots increase fast into large bunches, spreading widely round, they should be cut in, or be slipped occasionally, otherwise they are apt to overrun the ground; and to have the ground dug between the plants annually.

The latter sorts are somewhat tender, but only require shelter from frost, being kept in pots, and deposited among the green-house plants, and treated as other shrubby exotics of that collection. They effect a very agreeable variety at all times of the year, but particularly in summer and autumn, when in flower.

TARCHONANTHUS, a genus containing a plant of the shrubby evergreen exotic kind.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Nucamentaceæ*.

The characters are: that the calyx is common turbinate, one-leafed, commonly half-seven-cleft, coloured internally, shorter than the corolla, sharpish, permanent: the corolla compound uniform: florets about twenty: corollets hermaphrodite, numerous, equal: proper one-petalled, funnel-form, five-toothed: the stamina have five filaments, capillary, very

short: anther cylindric, tubular, length of the corollet, tailed at the base: the pistillum is a superior germ, oblong: style twice as long as the flower: stigmas two, gaping: there is no pericarpium: calyx unchanged: the seeds solitary, oblong: down hairy, investing the seed all round: the receptacle hairy, very small, hairs length of the calyx.

The species cultivated is *T. camphoratus*, Shrubby African Fleabane.

It has a strong woody stem, rising to the height of twelve or fourteen feet, sending out many woody branches at the top, which may be trained to a regular head: the leaves are in shape like those of the Broad-leaved Sallow, having a downy surface like Sage, and their under sides white; in smell they resemble Rosemary leaves when bruised: the flowers are produced in spikes at the extremity of the shoots, but, being of a dull purple colour, do not make much show: they appear in autumn, and continue great part of the winter. It retains its leaves all the year, and is a native of the Cape.

Culture.—This plant may be increased by cuttings, which should be planted out in the spring or early summer seasons in pots filled with light mould, giving them shade and water occasionally. They soon strike root, and in three or four months may be potted off into separate pots, affording them shade and water as before, and placing them under shelter. They also strike root in the summer season when planted in a common border and covered with hand-glasses, and may in these cases be potted off in the autumn.

They afterwards require the management of other hardy green-house plants.

They afford variety in these situations.

TARRAGON. See ARTEMISIA.

TAXUS, a genus furnishing a plant of the hardy evergreen tree kind.

It belongs to the class and order *Dioecia Monadelphia*, and ranks in the natural order of *Coniferæ*.

The characters are: that in the male there is no calyx, except a bud like a four-leaved perianth: corolla none: the stamina have numerous filaments, united at bottom into a column, longer than the bud: anthers depressed, blunt at the edge, eight-cleft, gaping every way at the base, and, when they have discharged their pollen, flat, peltate, and remarkable for their eight-cleft margin: female—the calyx as in the male: corolla none: the pistillum is an ovate-acuminate germ: style none: stigma obtuse: the pericarpium is a berry from the receptacle, elongated into a præputium globular, succulent, gaping at the top, coloured, at length wasting from dryness, and evanescent: the seed one, ovate-oblong, prominent at the top, beyond the berry.

The species cultivated is *T. baccata*, Common Yew-tree.

It has a straight trunk, with a smooth deciduous bark: the wood very hard, tough, and of a fine grain: the leaves thickly set, linear, smooth, evergreen: the flowers axillary, enveloped with imbricate bractes: the male on one tree, sulphur-coloured, without a calyx; the female on another, with a small green calyx, sustaining the oval flattish seed; which calyx at length becomes red, soft, and full of a sweet slimy pulp. It is a native of Europe, North America, &c.

It varies with very short leaves, with broad shining leaves, and with striped or variegated leaves.

Culture.—In this tree the increase may be effected by seeds, and sometimes by layers and cuttings.

After having procured a quantity of the Yew berries, and divested them of the pulp or mucilage, they should be sown in beds of light earth, either in shallow drills, or scattered over the surface, in the autumn or spring season (but the former is the best method, as the plants rise in the following spring), and be covered near an inch deep with light mould, out of the alleys, &c. They require no further care, only to keep the beds clean from weeds before and after the plants come up, and to give occasional waterings in dry weather, in spring and summer, to forward and strengthen the plants in their growth. They should have two years' growth in the seed-bed; then in the autumn or spring be planted out upon four-feet-wide beds, in nursery-rows, a foot asunder, to remain two, three, or four years, when some may be planted out finally for hedges, where required; others in the nursery quarters, in rows, two or three feet asunder, to be trained in a suitable manner for the purposes they are intended.

After growing in the nursery till they obtain from half a yard to four or five feet stature, they may be finally planted out in autumn or spring, for their intended purposes; when they will rise with a large spread of roots. They should be planted in their places as soon after removal as possible, giving each plant a good watering at the time.

In the future culture, those trained in hedges, &c. must be clipped annually, once or twice in the summer; and those in the shrubberies and rural plantations have the lower branches pruned up occasionally to a single stem; but the head

should generally be permitted to spread agreeably to its natural mode of growth, except just reducing any considerable rambling branch, &c.

The Striped or Variegated Yews, and other varieties, should be increased by layers or cuttings, as they are rarely permanent by seeds.

The layers should be made from the young shoots of not more than a year or two old, being laid down in spring, summer, or early in autumn, when many of them will take root, and in one or two years be fit for planting off into nursery-rows.

The cuttings should be made by cutting or slipping off a quantity of the one-year's shoots, divesting them of the lower leaves, and planting them in a shady border thick together, in small trenches, in the early spring or autumn, giving water at planting, and afterwards occasionally in dry hot weather. They will be well rooted in two years, and fit for being planted out into wide nursery-rows.

These plants may be employed as ornamental evergreens and as forest-trees; and they were formerly much used in hedges and trained figures: they have a good effect in shrubberies among others of the evergreen tribe, being permitted to assume their natural growth, in common with other trees and shrubs; and when planted as detached standards, in extensive distant opens of grass-ground, in parks, and the sides of hills, &c. likewise when introduced as forest-trees in timber plantations of the evergreen kind. See PLANTATION.

For hedge-work, where internal hedges are required, either for ornament or shelter, no tree is better calculated, from its forming the closest, even, moderate-growing hedge of any tree of the evergreen collection. It is also calculated for training into formal or fancy figures, both in hedge-work and as detached objects, from its branches and leaves growing exceedingly close, and shooting very moderately and with regularity.

For these purposes the trees should be trained in their minor growth in the nursery; if for hedges or any fancy figures, by suffering the plants to branch away immediately from the very bottom, and cutting them with garden shears once or twice every summer; and if for the shrubbery or other rural plantations, by pruning them up a little at bottom to a single stem, and suffering the heads to branch out on all sides and at top diffusively; likewise, if for larger detached standards, by trimming up the stems gradually to elevate them in proportion, and encourage the heads to branch out, and spread widely.

TELEPHIUM, a genus furnishing a plant of the small hardy perennial kind.

It belongs to the class and order *Pentandria Trigynia*, and ranks in the natural order of *Portulaceæ*.

The characters are: that the calyx is a five-leaved perianth: leaflets oblong, obtuse, concave, keeled, length of the corolla, permanent: the corolla has five petals, oblong, obtuse, narrower below, erect, inserted into the receptacle; the stamina have five awl-shaped filaments, shorter than the corolla: anthers incumbent: the pistillum has a three-sided acute germ: style none: stigmas three, acute, spreading: the pericarpium is a short capsule, three-sided, three-valved, one-celled: the receptacle free, shorter by half than the capsule: seeds very many, roundish.

The species cultivated is *T. Imperati*, True Orpine.

It has a root composed of yellowish woody fibres, spreading out wide: the stalks and branches are slender, trailing, eight or nine inches long: the leaves small, ovate, grayish, smooth and pretty stiff, having one longitudinal nerve running through the middle: the flowers terminating, in short thick bunches, or corymbs, reflexed, of a white colour. It is a native of the South of France, Spain, &c. flowering from June to August.

Culture.—This plant is increased by sowing the seeds in the autumn or spring, in dry light mould, either where the plants are to remain, or in beds to be afterwards planted out. They appear in the spring, when they should be kept clear from weeds, and they will flower the following year.

It is also capable of being increased sometimes by offsets, slips, or cuttings, planted out in the spring season.

The plants afford variety in the common borders and clumps.

TEA-BUCKTHORN. See RHAMNUS.

TEA, NEW JERSEY. See CEANOTHUS.

TEA, NEW ZEALAND. See PHILADELPHUS.

TEA, OSWEGO. See MONARDA.

TEA TREE. See THEA.

TEA, WEST INDIAN. See SIDA.

TERRACE, a sort of raised bank of earth, &c. regularly formed in an oblong manner to any length, broad enough to admit of a spacious level walk at top, and elevated considerably above the level of the general surface; having the sides uniformly sloped, and laid with grass, and the top formed into a flat or level, sufficiently broad for a grass or gravel walk, of pro-

portionable width; designed in gardens as a high, airy walk, to command a better prospect of the adjacent places around, within and without the garden occasionally, as well as to enjoy the fresh air in summer more freely. In the former style of laying out gardens, it was considered as very ornamental, but is at present much in disuse.

The height of a Terrace-walk may be more or less as the situation admits, as from one foot to one or two yards; or even three or four yards or more in particular situations, and where there are plenty of earthy materials, rubbish, &c. to form it, allowing breadth in proportion, from five to ten or twenty feet or more, and extended to any length required. They are sometimes formed on some naturally high, rising ground, to save as much trouble as possible, in bringing stuff from a distance; and sometimes raised wholly of forced materials.

The situation for a Terrace may be varied as the natural situation of the place may require.

In respect to form, they should always be broader at the base than the top, and extend lengthways to any distance required; having the sides regularly sloped, of more or less acclivity, as the width, height, and situation admit. Sometimes both sides are sloped, and sometimes only one side, the other perpendicular, and faced with a substantial wall, &c. or formed against the side of a hill, or some naturally rising ground; being finished always broad enough at top to admit of a proper walk. In some naturally-elevated situations, Terraces are sometimes formed one above another in two or more ranges, each having its separate side slopes, and elevated walk; in all of which the slopes are to be neatly laid with grass, and the walk at top occasionally of grass or gravel.

The entrances leading to Terrace-walks were formerly sometimes formed by an easy acclivity of a grass or gravelled slope, and sometimes by a grand flight of stone steps.

Where a rising ground, of considerable elevation, naturally presents itself in a proper situation, it is an eligible opportunity for forming a Terrace with the least expense and trouble, on account of its not requiring the addition of so much earth and rubbish as when raised entirely on a perfect level, wholly of made earth. Where there are any excavations of ground intended to form ha-has, pieces of water, &c. the excavated earth may be employed in forming Terraces, &c.

In the forming of a Terrace, the base must be staked out wider than the intended width at top for the walk, in order to admit of the ascent of slopes being moderate. And the whole of the made earth and rubbish must be well rammed and rolled down from time to time as it is applied, in order to render the whole equally firm, that it may not settle irregularly after being finished. The slopes may either be laid with turf, or sown with grass-seeds; but the first is much the best method where it can be employed. See GRASS-GROUND.

TETRAGONIA, a genus containing plants of the shrubby and herbaceous succulent perennial kinds.

It belongs to the class and order *Icosandria Pentagynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is a four-leaved perianth, superior: leaflets four, ovate, bent down and flat, rolled back at the edge, coloured, permanent: there is no corolla, unless the calyx be called so: the stamina have twenty filaments, capillary, shorter than the calyx: anthers oblong, incumbent: the pistillum is a roundish germ, five-cornered, inferior: styles four, awl-shaped, recurved, length of the stamens: stigma longitudinal of the style, pubescent: the pericarpium is a coriaceous drupe, four-cornered with four longitudinal wings; the opposite angles narrower, not opening: the seed one, bony, four-celled: kernels oblong.

The species cultivated are: 1. *T. fruticosa*, Shrubby Tetragonia; 2. *T. decumbens*, Trailing Tetragonia; 3. *T. herbacea*, Herbaceous Tetragonia; 4. *T. echinata*, Hedge-hog Tetragonia.

The first has slender woody stems, rising three or four feet high if supported, otherwise trailing, covered with a light gray bark, and dividing into a great number of trailing branches, which when young are succulent, of an herbaceous colour, and covered with small pellucid drops, which reflect the light, somewhat like the Diamond Ficoides: as the branches grow older, they become more woody: the leaves are narrow, thick, succulent, about half an inch long, and a tenth of an inch broad, concave and blunt-pointed; they are placed alternately, and at their base comes out a cluster of smaller leaves, which have the like pellucid drops with the stalks: the flowers axillary, at every joint towards the ends of the branches, solitary, or two or three together. The fruit is an inferior juiceless drupe.

The second species has larger stalks than the preceding, but they branch out in like manner: the branches trail upon the ground; the young branches are very succulent, and almost as thick as a man's little finger: the leaves are two inches long, and an inch broad; their surface covered with very small pellucid drops, as are also the young branches: flowers larger, upon pretty

long footstalks, three or four from the same point: the calyx and anthers are of a pale sulphur colour. It flowers from July to September.

The third has large fleshy roots: the branches weak and trailing, generally decaying about midsummer, and new shoots produced late in autumn. the leaves come out in bunches; they are oval, plane, and not so thick and succulent as in the other sorts; they are little more than an inch long, and half an inch broad: the flowers are produced from the wings of the leaves in February; they are like those of the second sort, and have long slender footstalks. It flowers in June and July.

The fourth species has a biennial root: the stem herbaceous, near the root dividing into diffused branches, rendered angular by the petioles running down them; scarcely a foot long: the leaves succulent, spreading, an inch in length: petioles shorter by half than the leaves: the peduncles axillary, solitary, filiform, covered with shining bladders, purple, very short: the flowers pendulous, appearing as if frosted with crystalline bladders. It flowers from May to August.

They are all natives of the Cape.

Culture.—The first and fourth sorts may be increased by cuttings, which should be cut off from the plants a few days before they are planted, that the part where they are cut may be healed, setting them out in July, that they may have time to make good roots before winter, on a bed of fresh earth, shading them from the sun in the heat of the day. They should afterwards be frequently refreshed with water in small quantities. In a few weeks, when well rooted, they should be taken up, and planted into pots filled with light fresh undunged earth, and placed in a shady situation until they have taken new root, after which they may be placed with other hardy exotic plants in a sheltered situation, where they may remain till the middle or latter end of October; at which time they should be removed into the green-house, and placed where they may enjoy as much free air as possible in mild weather, as they only require to be protected from the frost, being pretty hardy with respect to cold. As when planted in the full ground in the summer season they are apt to grow rank and large, or even when permitted to root into the ground through the holes at the bottom of the pots, the pots should be frequently removed to prevent it, as they are injured by it.

The first and second sorts are likewise capable of being raised by seeds, sown in a gentle hot-bed or in a warm border of light fresh earth, in the spring. When the plants are about four inches high, they may be planted out in pots, treating them in the same manner as the cuttings.

And the third sort will grow from cuttings planted early in the spring, in the same manner as the others.

They afford ornament among other potted plants.

TEUCRIUM, a genus furnishing plants of the under-shrubby and herbaceous kinds.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leafed perianth, half-five-cleft, acute, almost equal, gibbous at the base on one side, permanent: the corolla one-petalled, ringent: tube cylindric, short, ending in an incurvated throat: upper lip erect, acute, deeply two-parted beyond the base; the segments at the sides distant: lower lip spreading, trifid: the lateral segments of the same form with the upper lip, almost erect; the middle one very large, and somewhat rounded: the stamina have four awl-shaped filaments, longer than the upper lip of the corolla and ascending in the cleft of it, prominent: anthers small: the pistillum is a four-parted germ: style filiform, situation and size of the stamens: stigmas two, slender: there is no pericarpium: calyx unchanged, fostering the seeds at the bottom: the seeds four, roundish.

The species cultivated are: 1. *T. flavum*, Yellow-flowered Shrubby Germander; 2. *T. Scorodonia*, Sage-leaved Germander, or Wood Sage; 3. *T. Canadense*, Nettle-leaved Germander; 4. *T. montanum*, Dwarf Mountain Germander; 5. *T. Pyrenaicum*, Pyrenean Germander; 6. *T. Polium*, Poley; 7. *T. capitatum*, Round-headed Germander; 8. *T. pumilum*, Dwarf Germander; 9. *T. fruticans*, Narrow-leaved Tree Germander; 10. *T. latifolium*, Broad-leaved Tree Germander; 11. *T. Creticum*, Cretan Germander; 12. *T. Marum*, Common Marum or Cat-thyme.

The first has a shrubby, branched, pubescent stem, often procumbent at the base: leaves ovate, shining above, pubescent beneath, crenate, obtuse, petioled; the upper ones quite entire; the whorls from two to six-flowered, distinct: the flowers pedicelled. According to Miller, they are of a dirty white colour, and appear in July. It is a native of the South of Europe, &c.

There is a variety, which is hairy, with yellow flowers, with pale white flowers, and with purple flowers.

The second species has a perennial creeping root: the stems a foot and half or two feet high, four-cornered, nearly upright, hairy, leafy, hard,

often purple; panicle racemed: leaves opposite, wrinkled, hairy, veiny, and wrinkled like Sage, somewhat glutinous, strong-smelling, bitter: the flowers are in pairs, on long opposite naked racemes, pedicelled. It is a native of Europe and Morocco, flowering from July to September. It is used sometimes as hops in beer.

The third is a perennial plant, very like the second, but does not creep at the root as that does: the stalks are erect: the leaves are white on their under side, and deeply serrate: the flowers yellow in terminating racemes. It is observed by Marshall, that the plant from Canada has narrower leaves, equally serrate, tomentose beneath, flat: the spike is composed of whorls or scattered flowers, with a very small bracte under each. But the garden plant has larger wrinkled leaves, unequally serrate, scarcely pubescent beneath; and flowers in a subspiked raceme, of six-flowered, six-leaved whorls, with serrate bractes. It is a native of North America, flowering in August and September.

The fourth species, according to Miller, has the root composed of many woody fibres, which spread wide; hence arise several weak, trailing, woody stalks, eight or nine inches long, sending out many branches: the leaves are small, of a deep green: the flowers white, appearing in June and July; but seldom succeeded by seeds in this climate. It is a native of Germany.

There is a variety with much smaller leaves, hoary on their under side.

The fifth has slender shrubby stalks, which trail close upon the ground; they have a purple bark, and are covered with white hairs: the leaves are round at the top, but at their base are contracted in form of a wedge, so as to resemble at first sight the leaves of Ground-ivy, but they are hairy, and of a thicker consistence: the flowers are collected in round bunches at the end of the branches: the corolla is large; and one half of it is purple, the other white. It flowers great part of the summer, but seldom produces seeds in this climate. It grows naturally on the Pyrenean mountains.

The sixth species has the stems suffruticose, round, procumbent: the whole plant tomentose and hoary: the leaves are oblong, lanceolate or almost linear: the flowers sessile, close and lying over each other, small: bractes the length of the calyx: corolla yellow: the middle segment concave, entire. It is a native of the South of Europe, the Levant, &c.

There are several varieties: as Common Yellow Poley, which has the stalks rather herbaceous and trailing, about six inches long and hoary: leaves woolly, about half an inch long, some wedge-shaped, others oblong, ending in obtuse points, and crenate towards their ends: the flowers collected in oblong thick spikes at the end of the branches, of a deep yellow colour, and appearing at the beginning of June. This grows naturally in Spain.

The Narrow-leaved Yellow Poley, which has woody stalks, erect, branching, and covered with a hoary down, rising six or eight inches high: the leaves linear, woolly, about half an inch long, having sometimes two or three slight indentures on their edges: the flowers collected in roundish spikes at the end of the branches; they are bright yellow, have woolly calyxes, and appear in June and July. It grows naturally in Spain and Portugal.

The White Poley, which has the stems a foot long and trailing: the leaves are a little cottony, entire on the sides, but toothed at the end: the flowers are pretty large, white tinged a little with purple. It it a native of the South of France. There is also the Purple Poley.

The seventh is shrubby, branched at the base: the branches round, tomentose, erect: the leaves sessile, linear-lanceolate, obtuse, often ternate: the flowers corymbed, headed, close: calyxes villose-tomentose: the corolla small, pale yellow or white. It has the habit of Origanum Majorana, but is tomentose, and has narrow leaves. It is a native of France, &c.

There is a variety which has an erect branching stalk, which rises a foot high; the lower part becomes woody, but the upper is herbaceous: the leaves are linear-lanceolate, about an inch long, crenate, of a pretty thick consistence, and a little woolly: the flowers collected in a corymb at the end of the branches, white, appearing in July and August.

The eighth species has ligneous procumbent slender downy stems, lying on the ground: the leaves in clusters; the flowers reddish, collected into small heads at the ends of the branches; coming out in June and July. It is a native of Spain.

The ninth has a shrubby branching stalk, rising six or eight feet high, and covered with a hoary bark: the leaves opposite, ovate, sessile or on very short petioles, near an inch long, and half an inch broad, smooth and of a shining green above, and hoary beneath: the flowers are axillary from the upper part of the branches, one on each side at a joint, on short peduncles. A native of Spain, &c., flowering in February.

There is a variety which is a little more branched, and has smaller shorter leaves: the flowers are paler, the stamens somewhat longer, the anthers smaller and brown, whereas in the larger sort they are violet: and another with variegated leaves.

The tenth species is a shrubby plant, growing seven or eight feet high, and may be trained to a much greater height: the flowers are somewhat shorter and smaller, though the leaves are larger; they are not blue but purplish, with more conspicuous veins and streaks; the anthers are of a dusky greenish colour; the leaves are broader, of a rhomboid form, more hairy, and whiter on their under side. It is a native of Spain, flowering from June to September.

The eleventh has the leaves acuminate, white beneath: the flowers in threes, or solitary: the calyxes are spiny. It is a native of Candia and Egypt.

The twelfth species has a low shrubby stalk, sending out many slender woody branches, in warm countries rising three or four feet high, but in England rarely half that height: the stalks are very hoary, and have small leaves placed opposite at each joint, about the size of those of Thyme, and pointed at both ends, green above, hoary underneath, having a grateful scent, but so piercing as to cause sneezing: the flowers grow in loose whorled spikes at the ends of the branches; they are very downy, and of a bright red colour; appear in July and August, but produce no seeds in this climate. It is a native of Spain.

Culture.—All the herbaceous and ligneous kinds may be readily increased by parting the roots, by slips of the young branches, and seeds: the roots may be divided in the autumn, or early spring, and the slips of the branches be taken off in the spring and summer, being planted out in moist shady situations; and when well rooted, they may be removed to where they are to remain, though it is best to plant them at once where they are to grow: the seeds may be sown in a bed or border of common earth in the early spring season.

In the *Polium* kinds the seeds should be sown in a bed of light earth, and the plants be either put out in nursery-rows, or set where they are to remain, in the latter end of summer.

The shrubby sorts may likewise be increased by slips or cuttings of the young shoots of the branches, which should be planted in pots filled with light mould, in the spring and summer months, in order to be removed under the protection of the green-house in winter, being afterwards managed as other green-house exotics.

The first sorts afford variety in the borders, &c., and the latter in assemblage with green-house plants.

THALICTRUM, a genus containing plants of the hardy, herbaceous, fibrous-rooted, perennial kinds.

It belongs to the class and order *Polyandria Polygynia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that there is no calyx, unless the corolla be taken for it: the corolla has four petals, roundish, obtuse, concave, caducous: the stamina have very many filaments, wider at top, compressed, longer than the corolla: anthers oblong, erect: the pistillum, styles very many, very short: germs many, commonly pedicelled, roundish: styles none: stigmas thickish: there is no pericarpium: the seeds many, grooved, ovate, tailless.

The species cultivated are: 1. *T. tuberosum*, Tuberous-rooted Meadow Rue: 2. *T. Cornuti*, Canadian Meadow Rue: 3. *T. fœtidum*, Fetid Meadow Rue: 4. *T. angustifolium*, Narrow-leaved Meadow Rue: 5. *T. lucidum*, Shining-leaved Meadow Rue: 6. *T. aquilegifolium*, Columbine-leaved Meadow Rue, or Feathered Columbine.

The first has knobbed roots: the leaves small, obtuse, indented in three parts at their points, of a grayish colour and smooth: the stalks rise a foot and half high, and are naked almost to the top, where they divide into two or three small ones, under each of which is placed one leaf; every division is terminated by a small bunch of pretty large flowers, disposed almost in form of an umbel, each composed of five white petals. It is a native of Spain, flowering in June.

The second species attains the height of three feet: the stems suffruticose, dark purple, branched: leaves resembling those of Columbine, but glaucous: the flowers in many pale-purple heads, five-petalled and white. It is a native of North America, flowering from May to July.

There is a variety, which is smaller, with pale purple filaments.

The third has the stem about six or seven inches high: the leaves downy, composed of a great number of small leaflets, which are bluntly indented, and have a fetid scent: the flowers in loose panicles, small, and of an herbaceous white colour: the leaves are somewhat hairy on both sides, pulpy and soft: the petals themselves are somewhat hairy, in the young plant reddish, but in the adult whitish, almost a foot high, and not very leafy. It is a native of the South of France, Switzerland, &c., flowering from May to July.

The fourth species has the stems from two to three feet high: the flowers small, collected in terminating panicles, and of an herbaceous white colour. It is a native of Germany and Switzerland, flowering in June and July.

The fifth has the stems upright, channelled, five or six feet high, having at each joint pinnate

leaves, composed of many linear fleshy leaflets, which are for the most part entire, and end in acute points: the flowers are of a yellowish white colour; they appear in July, and are succeeded by small angular capsules, with one small oblong seed in each, which ripens in August. It is a native of France about Paris, and of Spain.

The sixth species has a thick fibrous root; the stems taper, rising three feet high: the leaves like those of Columbine: the flowers in large terminating panicles. It is a native of Scania, Switzerland, &c.

There are varieties with a green stalk and white stamens, and with a purple stalk and stamens. There are other sorts that may be cultivated for variety.

Culture.—All the sorts are readily increased by parting the roots, and planting them out in the autumn when the stems decay, or in the spring before the new ones are sent forth, in the strongest where they are to remain, and the weaker ones in nursery-rows for further growth: they may also be raised from seeds, which should be sown in a bed or border in the spring; when the plants rise, they should be kept clean, and be planted out where they are to remain, in the following autumn. They afford variety in the borders, and other parts of ornamented grounds.

THEA, a genus furnishing plants of the exotic shrubby kind.

It belongs to the class and order *Polyandria Monogynia*, (*Trigynia*,) and ranks in the natural order of *Columniferæ*.

The characters are: that the perianth is five-parted, very small, flat, inferior, permanent: segments roundish, obtuse, equal: the corolla has six petals, (three to nine) roundish, concave, large; of which two are exterior and a little smaller: the stamina have numerous filaments, (more than two hundred) filiform, shorter than the corolla, inserted into the receptacle: anthers cordate, fastened by the back: the pistillum is a globular-trigonal germ: styles three, united at the base, at bottom erect, closely approximating, and as it were united into one; above the stamens diverging, somewhat recurved at the top, after flowering separated to the very base, reflexed at the top: stigmas simple: the pericarpium is a tricoccous capsule, trilocular, gaping at the top, in three directions: the seeds solitary, globose, angular on the inward side.

The species is *Thea*, Tea-Tree.

It is commonly about the height of a man. It is described indeed by different authors, as varying much in size, from that just mentioned to thirty and even two hundred feet. Probably it may attain the height of thirty feet or more when left to itself; but in general the trees are cut down periodically, that they may make stronger shoots, and therefore are seldom seen to be above five or six feet high. The trunk is branching and round: the branches alternate or vague, stiffish, inclining to an ash-colour, but reddish towards the end: the leaves alternate, elliptic, smooth, glossy, of a firm texture, bluntly serrate except near the base, blunt and for the most part slightly emarginate at the end, veined on the under side, on very short petioles, round and gibbous beneath, flattish and slightly channelled above: the stipules to the leaves none: peduncles axillary, alternate, single, curved, one-flowered, incrassate, having at the base a single stipule or bracte, which is awl-shaped, erect, elliptic, obtusely serrate, with the edges between the teeth recurved: the corolla white, varying in the number and size of the petals: the stamens, according to Loureiro, inserted rather into the base of the corolla than into the receptacle.

In respect to the varieties, Martyn has considered them all as forming one species, in which, he is, he says, supported by the best authorities. "Kæmpfer," says he, "attributes their difference to soil, culture, age of the leaves, and method of curing them. Mr. Ellis directly asserts that the Green and Bohea Tea are one and the same species; and that it is the nature of the soil, the culture, and manner of gathering and drying the leaves, that makes the difference; and a Green Tea-tree planted in the Bohea country will produce Bohea Tea, and the contrary. So also Sir George Staunton says; every information received concerning the Tea plant concurred in affirming, that its qualities depended upon the soil in which it grew, and the age at which the leaves were plucked off the tree, as well as upon the management of them afterwards. Linnæus, it is well known, distinguished two species of Thea; the *Bohea* with six-petalled flowers, and the *Viridis* or Green with nine-petalled flowers: but it is now well ascertained that the number of petals is very uncertain; and Dr. Lettsom informs us that he has examined several hundred flowers both from the Bohea and Green countries, and that their botanical characters have always appeared uniform. In the catalogue of the royal botanic garden at Kew, two varieties of Thea Bohea are given, distinguished by the leaves; namely, Laxa or Broad-leaved Tea, with elliptic-oblong wrinkled leaves; and Stricta, or Narrow-leaved Tea, with lanceolate flat leaves. The Bohea Tea-trees now introduced into many botanic gardens near London, exhibit very obvious varieties: the leaves are of a deeper green colour, and not so deeply serrated; and the stalk is usually of a darker colour: but the botanical characters

are the same. Thunberg also distinguishes two varieties from the leaves, which in one are smaller, flat, darker green, with straight serratures, and in the other larger, waved, brighter green, with sinuate serratures: but they can scarcely be considered as distinct species. Loureiro observed little difference in the Sou-chong, which he examined: both these have a brown colour, but are more odoriferous and precious than the common Bohea of the province of Fo-kien, which he had not an opportunity of seeing in a living state, though it is the most common and cheapest of all. He examined the dry flowers of the Green tea, from the province of Kiang-si, and observed the same inconstancy, as to the number of parts in the calyx and corolla, as in the Bohea. Upon the whole he concludes that all the differences of Chinese tea form only one botanical species, owing their variation to soil, culture, and method of preparation; all retaining the same inconstancy in the parts of the flower, which gave occasion to Linnæus to consider them as two species."

It is added, "that many varieties of tea are known in China, from mixture and management." The distinctions chiefly regarded in Europe are the following.

"*Green Teas.*—1. Bing, Imperial or Bloom Tea, with a large loose leaf, of a light green colour, and a faint delicate smell.

"2. Hy-tiann, Hikiong, Hayssuen or Heechun, known to us by the name of Hyson Tea: the leaves are closely curled and small, of a green colour verging towards blue. Another Hyson Tea, with narrow short leaves, is called Hyson-utchin. There is also a green tea named Gobé, with long narrow leaves.

"3. Song-lo or Singlo, which name it receives, like several others, from the place where it is cultivated."

"*Bohea Teas.*—1. Soo-chuen, Sut-chong, Sou-chong, or Su-chong, called by the Chinese Saa-tyang, and Sact-chaon or Sy-tyann, is a superior kind of Cong-fou Tea. It imparts a yellowish green colour by infusion, and has its name from a place or province in China. Padre Sutchong has a finer taste and smell: the leaves are large and yellowish, not rolled up, and packed in papers of half a pound each. It is generally conveyed by caravans into Russia; without much care it will be injured at sea. It is rarely to be met with in England.

"2. Cam-ho or Soum-lo, called after the name of the place where it is gathered: a fragrant tea with a violet smell; its infusion is pale.

"3. Cong-fou, Congo, or Bong-fo: this has a larger leaf than the following, and the infusion is a little deeper coloured. It resembles the common Bohea in the colour of the leaf.

"There is a sort called Lin-Kisam, with narrow rough leaves. It is seldom used alone, but mixed with other kinds. By adding it to Congo, the Chinese sometimes make a kind of Pekoe tea.

"4. Pekao, Pecko, or Pekoe, by the Chinese called Back-ho or Pack-ho. It is known by having the appearance of small white flowers intermixed with it.

"5. Common Bohea or Black Tea, called Moji or Mo-ee by the Chinese, consists of leaves of one colour. The best is named Tao-kyonn. An inferior kind is called Au-kai, from a place of that name. In the district of Honam, near Canton, the tea is very coarse, the leaves yellow or brownish, and the taste the least agreeable of any. By the Chinese it is named Honam-té, or Kuli-té.

"Besides these, Tea both Bohea and Green is sometimes imported in balls, from two ounces to the size of a nutmeg and of peas. The Chinese call it Poncul-tcha. The smallest in this form is well known under the name of Gunpowder Tea.

"Sometimes the succulent leaves are twisted like packthread, an inch and half or two inches long; three of these are usually tied together at the ends by different-coloured silk threads. Both Green and Bohea are prepared in this manner.

"The manner of gathering and preparing the leaves, as practised in Japan," according to Kæmpfer, "as far as our information reaches, is in a great measure conformable to the method used by the Chinese.

"The leaves are gathered carefully one by one, and each person is able thus to collect from four to ten or fifteen pounds in one day. The first gathering commences about the end of our February, or beginning of March, when the leaves are young and tender: they are called Ficki Tsjaa or powdered tea, because they are pulverised and sipped in hot water: they are disposed of to princes and rich people only, and hence this kind is called Imperial Tea.

"A similar sort is called Udsi Tsjaa, and Tacke Sacki Tsjaa, from the places where it grows. Peculiar care and nicety is observed in gathering these leaves.

"The second collection is made at the end of March or beginning of April. This is called Tootsjaa, or Chinese Tea, because it is infused and drunk after the Chinese manner.

"The third gathering is made in June, when the leaves are full grown. This is called Ban Tsjaa; it is the coarsest, and is chiefly consumed by the lower class of people. By sorting these, several other varieties are produced.

"Whether the Chinese collect the tea precisely at the same seasons as in Japan, we are not well informed; but most probably the tea

harvest is nearly at the same periods, the natives having frequent intercourse, and their commercial concerns with each other being very extensive.

"The tea leaves should be dried as soon as possible after they are gathered. For this purpose public buildings are erected, containing from five to ten, and even twenty small furnaces about three feet high, each having at the top a large iron pan. There is also a long table covered with mats, on which the leaves are laid, and rolled by workmen who sit round it. The iron pan being heated to a certain degree by a fire made in the furnace beneath, a few pounds of the leaves are put upon the pan, and continually turned and shifted by the hands till they become too hot to be endured; they are then thrown upon the mats to be rolled between the palms of the hands; after which, they are cooled as speedily as possible. In order that all the moisture of the leaves may be completely dissipated, and their twisted form be better preserved, the above process is repeated several times with the same leaves, but less heat is employed than at first. The tea thus manufactured is afterwards sorted according to its kind or goodness. Some of the young tender leaves are never rolled, and are immersed in hot water before they are dried.

"Country people cure their leaves in earthen kettles, which answer every necessary purpose, at less trouble and expense, whereby they are enabled to sell them cheaper.

"After the tea has been kept for some months, it is taken out of the vessels in which it was stored, and dried again over a very gentle fire, that it may be deprived of any humidity which remained, or it might have since contracted.

"The common tea is kept in earthen pots with narrow mouths; but the best sort used by the emperor and nobility is put into porcelain or china vessels. The coarsest tea is kept by the country people in straw baskets, made in the shape of barrels, which they place under the roofs of their houses, near the hole that lets out the smoke."

Culture.—These plants may be raised in this country by seeds, layers and cuttings of the young branches. The editor of Miller's Dictionary advises that the seeds should be procured from China, and that care should "be taken that they be fresh, sound, ripe, white, plump, and moist internally. After being well dried in the sun, they may be inclosed in bees-wax, or, left in their capsules, they may be put into very close canisters of tin or tutenague. Thouin, in his directions to Perouse, he says, recommends these and other seeds to be placed in alternate layers of earth or sand, in tin boxes, closed up exactly, and placed in solid cases, covered with waxed cloth; the boxes to be placed in a part of the ship the least accessible to moisture, and the most sheltered from extreme heat or cold." And "Mr. Sneyd," he adds, "was very successful in having seeds packed up in absorbent paper, and surrounded by raisins or moist sugar, which kept them in a state fit for vegetation. American seeds are frequently brought over, by putting them into a box, not made too close, upon alternate layers of moss, in such a manner as to admit the seeds to vegetate. This might be tried with the seeds of the Tea-tree; and to succeed more certainly, some of the seeds might be sown in pots or boxes, when the vessel arrives at St. Helena, and after passing the tropic of Cancer, near the latitude of thirty degrees north. But the best method" says he, "seems to be, to sow ripe seeds in good light earth in boxes, at leaving Canton; covering them with wire, to prevent rats and other vermin from coming to them; and taking care that the boxes be not exposed to too much air, nor to the spray of the sea. A little fresh or rain water should be sprinkled over them now and then; and when the seedling plants appear, they should be kept moist, and out of the burning sun. If young plants can be procured in China, they may be sent over in a growing state in boxes, forty inches long by twenty broad, and as much in depth, having a few holes bored through the bottom. When the trees arrive here they must be kept in a green-house during the winter, and in the open air during the summer; and if they come in bad condition, it may not be amiss to plunge the pots into which they are transplanted, in a gentle hot-bed, or to set them in the tan-pit, to make them strike and shoot more freely." It is further remarked, that "though the Tea-tree will not at present bear the rigour of our winters, in the open air, yet it is not impossible but it may gradually become naturalized to our climate, like the Magnolia, among several other trees and shrubs; especially if it were to be brought from the coldest provinces of China, where it grows, or from the parts of Europe a little to the southward of us, when it shall have been naturalized there." It is increased freely from cuttings, when managed in the same manner as Gardenias: and it also sometimes grows from layers laid down in the autumn or spring.

Some of these plants should be always kept in pots, to be removed under the shelter either of a green-house, glass case, or deep garden frame, in winter; and others be planted in a dry, well-

sheltered, warm, conspicuous part of the shrubbery, to afford occasional covering from rigorous frosts.

They afford variety in green-house collections, as well as in the shrubberies.

THEOBROMA, a genus containing a plant of the exotic tree kind.

It belongs to the class and order *Polyadelphia Decandria*, and ranks in the natural order of *Columniferæ*.

The characters are: that the calyx is a five-leaved perianth: leaflets lanceolate, acute, spreading, deciduous: the corolla has five petals, smaller than the calyx: claws wide, arched, concave like a helmet, emarginate at the tip, scored internally with a thick triple line inserted into the nectary at the base: borders roundish, acuminate, spreading, each narrowed at the base into a small claw which is from upright recurved, and fastened into the claw: nectary a short little pitcher, putting forth five little horns, which are awl-shaped, long, erect, acuminate, bent in and converging, decurrent along the pitcher: the stamina have five filiform filaments, erect, bent outwards at top, lying within the claws of the petals, growing externally to the nectary, alternate with and shorter than the horns: anthers on each filament two, (one on each side at the tip,) vertical, one cell superior, the other inferior: the pistillum is an ovate germ: style filiform, (striated, Aubl.) a little longer than the stamens: stigma five-cleft: the pericarpium is an oblong capsule, coriaceous, unequal, five-cornered, five-celled, valveless, not opening: the seeds very many, subovate, nestling in a buttery pulp, fastened to a central columnar receptacle.

The species is *T. Cacao*, Chocolate Nut Tree.

It grows in a very handsome form to the height of twelve or sixteen feet: the trunk is upright, and about as high as a man before the head spreads out: the wood is light and of a white colour, and the bark is brownish and even: the leaves lanceolate-oblong, bright green, quite entire, alternate, from nine to sixteen inches long, and three or four inches wide at most, on a petiole an inch in length and thickened at both ends: the peduncles slender, about eight or ten together, chiefly from the scars of the fallen leaves; one of them only for the most part fruitful, the rest abortive: the flowers small, reddish, inodorous: fruit smooth, yellow, red, or of both colours, about three inches in diameter: rind fleshy, near half an inch in thickness, flesh-coloured within: pulp whitish, the consistence of butter, separating from the rind in a state of ripeness, and adhering to it only by filaments, which penetrate it and reach to the seeds. Hence it is known when the seeds are ripe, by the rattling of the capsule when it is shaken: the pulp has a sweet and not unpleasant taste, with a slight acidity; it is sucked and eaten raw by the natives: it may be easily separated into as many parts as there are seeds, to which it adheres strongly, and they are wrapped up in it, so that each seed seems to have its own proper pulp: the seeds are about twenty-five in number: when fresh they are of a flesh-colour: gathered before they are ripe, they preserve them in sugar, and thus they are very grateful to the palate: they quickly lose their power of vegetation, if taken out of the capsule, but kept in it they preserve that power for a long time: the tree bears leaves, flowers, and fruit all the year through; but the usual seasons for gathering the fruit are June and December: in two years from the seed it is above three feet high, and spreads its branches, not more than five of which are suffered to remain: before its third year is complete it shows for fruit: a tree yields from two to three pounds of seeds annually. It is a native of South America.

Culture.—It is increased by seed obtained from abroad, sowing it as soon after its arrival as possible, in pots filled with light earth, and plunging them in a bark-bed, where they will soon come up; and when the plants are about three inches high, potting them off separately, and replunging them in the bark-bed in the stove, managing them as other woody exotics of the stove kind afterwards.

They afford an agreeable variety in stove collections.

THERMOMETER, an instrument constructed for the purpose of measuring the degrees of heat and cold at all seasons, and which is of great utility in the culture of tender exotic stove plants, by serving as a guide to regulate the proper degree of heat for the hot-houses containing such plants.

Their construction for this use consists of a long slender glass tube, or pipe, about eighteen inches or two feet long, having a small glass ball or globe at the lower end; and it is fixed longitudinally on a brass or wooden plate or frame, the same length, or longer, and four or five inches broad; the glass tube and ball being furnished with a quantity of coloured liquid spirit, or other fluid, which is affected by heat and cold so as to ascend higher or lower in the tube proportionably, a scale being marked on the frame along each side of the tube, divided into the different degrees of heat and cold: and the spirit ascending by the heat of the internal

air of the stove, promoted by fire, &c. points out on the scale the proper degree of heat required, having the name of some remarkable exotic, such as the anana, or pine-apple, written on the scale as a standard mark of the requisite temperature of heat, so as when the internal heat of the stove raises the spirit to that mark, or within five degrees over or under, is the proper temperature for the growth of the ananas, and all other tender plants from the hottest parts of the world; so that the fires requisite for the stove in winter, are to be made stronger or weaker accordingly.

They are more particularly useful in winter, during the time the fires are made in the flues for warming the air internally; one being generally hung up toward the centre of the stove, so as the warmth may operate moderately and equally on every side, and discover the real temperature of the general internal heat, which should be supported always nearly equal by the aid of bark hot-beds and real fire, sufficient to raise the spirit or other fluid in the tube to the mark ananas, or but a little over or under it.

They should not only be suspended nearly towards the centre of the stove, but also out of the sun, that the glass tube and ball containing the spirit or other fluid may be shaded as much as possible; and also at some medium distance from the fire-place and flues, so as neither the direct rays of the sun, or heat of the fire, darting immediately on the tube and ball, may affect the operation of the inclosed fluid, and cause it to mount higher than would be effected by the real general warmth of the air of the stove, and thereby lead into an error, in supposing the internal heat to be much stronger than it really is, when probably it is not strong enough. See ANANAS.

THICKETS, a sort of close plantations of trees and shrubs, in pleasure-grounds, parks, &c. They are designed for different purposes, as sometimes to repel the force of tempestuous and cold cutting winds, either from the habitation, or some particular part of the garden; or to form places of shade or retirement in summer, having spaces for walks, recesses, &c. under the umbrage of the trees, and occasionally to conceal from view any unsightly or disagreeable object, and also sometimes to form a screen or blind arranged towards some outward boundary.

On some occasions, they are introduced in the internal parts of large pleasure-grounds, and parks, in contrast to the more open and airy plantations, in which to have shady wood-walks winding variously through them, also to form recesses, by environing particular spaces, rendering them retired, shady, and sheltered, by the surrounding trees and shrubs composing the thickets: close thickets of hardy trees and shrubs are sometimes also disposed in detached clumps in capacious open situations, to effect a diversified ornamental variety, the clumps being distantly stationed so as not to obstruct the view of any desirable object.

They are sometimes planted wholly of the large tree kinds, five or six to eight or ten feet asunder, some in regular lines like a close grove, or more generally in a sort of promiscuous planting, but with some degree of order in the distances: they are also often composed of various trees and shrubs together to effect a more full, close growth below and above, and to display a greater diversity in the plantation, by disposing the various shrubs properly between the larger trees, in some order of gradation, the lowest towards the front, and the taller growths backward, so as to form a sort of close underwood thicket below, while the trees run up and form a thickety growth above: and sometimes they are formed wholly of shrubs of different sorts and degrees of growth, from the lowest placed forward to the tallest behind.

They are sometimes formed wholly of particular sorts of trees disposed separately in distinct plantations, as of elm, ash, beech, poplar, alder, willow, &c.

The planting of thicket plantations should be effected with young trees of from four, five or six, to eight or ten feet growth, and the shrub kinds proportionally; in all of which the planting may be performed in the common seasons of autumn, winter and spring.

In the culture of thicket plantations, little is required but that of keeping them clear from large overbearing weeds, while the trees and shrubs are in young small growth.

THISTLE, GLOBE. See ECHINOPS.
THISTLE, MELON. See CACTUS.
THISTLE, TORCH. See CACTUS.
THORN APPLE. See DATURA.
THORN, BOX. See LYCIUM.
THORN, CHRIST'S. See RHAMNUS.
THORN, COCKSPUR. See CRATÆGUS.
THORN, EGYPTIAN. See ACACIA.
THORN, EVERGREEN. See MESPILUS.
THORN, GLASTONBURY. See CRATÆGUS.
THORN, GOAT'S. See TRAGACANTHA.
THORN, HAW. See CRATÆGUS.
THORN, LILY. See CATESBÆA.
THORN, PURGING. See RHAMNUS.
THORN, WHITE. See CRATÆGUS.
THORNY TREFOIL. See FAGONIA.

THOROW-WAX. See Bupleurum.

THUJA, a genus containing a plant of the hardy evergreen tree kind.

It belongs to the class and order *Monœcia Monadelphia*, and ranks in the natural order of *Coniferæ*.

The characters are: that in the male flower the calyx is an ovate ament, composed of a common rachis, on which opposite flowers are placed in a triple opposition: each flower has for its base a subovate, concave, obtuse scale: there is no corolla: the stamina have four filaments (in each floret) scarcely manifest: anthers as many, fastened to the base of the calycine scale:—female flower on the same plant: the calyx is a common subovate strobile, surrounded with opposite florets; composed of two-flowered, ovate, convex scales, converging longitudinally: there is no corolla: the pistillum is a very small germ: style awl-shaped: stigma simple: the pericarpium is an ovate-oblong strobile, obtuse, opening longitudinally, with oblong scales, almost equal, convex outwardly, obtuse: the seeds oblong, girt longitudinally with a membranaceous wing, emarginate.

The species cultivated are: 1. *T. occidentalis*, American Arbor-vitæ; 2. *T. orientalis*, Chinese Arbor-vitæ.

The first has a strong woody trunk, which rises to the height of forty feet or more: the bark, while young, is smooth and of a dark brown colour, but as the trees advance the bark becomes cracked, and less smooth: the branches are produced irregularly on every side, standing almost horizontal, and the young slender shoots frequently hang down: these branches stand but thin, and the younger branches only have leaves, so that when the trees are grown large they make but an indifferent appearance, being so thinly clothed with the leaves: the young branches are flat, and the small leaves are placed over each other like the scales of fish: the flowers are produced from the side of the young branches, pretty near to the footstalk: the males grow in oblong catkins, and between these the females are collected in form of cones. When the former have shed their farina, they soon drop off; but the latter are succeeded by oblong cones, or strobiles, having obtuse smooth scales, containing one or two oblong seeds. It is a native of Siberia and Canada, where it is very plentiful, but not much further south.

There are different varieties; as the American Sweet-scented, and Variegated-leaved.

The second species has the branches growing closer together, and much more adorned with leaves, which are of a brighter green colour, and make a much better appearance than the former: the branches cross each other at right angles: the leaves are flat, but the single divisions are slender, and the scales smaller, and lie closer over each other than those of the first sort: the cones (strobiles) are also much larger, of a beautiful gray colour, and their scales end in acute reflexed points. It is a native of China and Japan.

Culture.—These plants may be increased by seeds, layers, and cuttings.

Good seeds should be obtained and be sown soon after they are ripe, or as soon as they can be obtained, in autumn or spring, in pots or boxes of light earth, covering them half an inch deep, placing the pots, &c. in a sheltered warm situation, or under the shelter of a frame in bad weather, especially when sown in autumn, that they may be protected from severe frosts: they sometimes come up in the spring, but are frequently apt to remain in the ground till the second year. When the plants are come up, the pots should be placed in an east border to have only the morning sun, but open to the free air, giving frequent but very moderate waterings all the summer; and in winter removing the pots again to a sheltered place till spring, when they may be pricked out in nursery-rows; or, when they are small and weakly, continued in the pots another year, placing them in a shady situation during summer, and in a sheltered place in winter; and in spring following planting them out in the nursery, in rows a foot or two asunder, to remain to acquire size and strength for planting out where they are to remain.

The layers should be made from the young shoots of one or two years growth, which may be laid down early in autumn, bending down the branches to the earth, and laying all the young wood in by slit- or twist-laying, with the tops only appearing a little above ground; shortening any that have much longer tops than the others: they mostly emit roots in the earth, and form proper plants by autumn following; when, or rather in spring after, they should be separated from the stools, and be planted in nursery-rows, to remain two or three years, or till of a proper size for the shrubbery, &c.

The cuttings should be made from the strong young shoots of the same year's growth, which should be planted in the autumn, in a shady border, taking the opportunity of showery weather, if possible, for the business: they should be cut off with a small part of the old wood, where practicable, and be planted in rows a foot asunder, closing the earth well about them: they will be properly rooted in one year

for planting out in wider nursery-rows: they may also be planted in pots, and placed in a hot-bed, in order to have them more forward.

They may be planted out into the borders, &c. in the autumn or early spring months.

They are highly ornamental evergreens, proper for adorning the shrubbery and other parts, having a fine effect also when disposed singly in borders, &c. and in open spaces of grass; in all of which situations they should be suffered to grow with their full branches, in their own natural way, except reducing with a knife any low straggling or rambling branches occasionally: this is all the culture they require afterwards.

They may also be employed as timber-trees, in the evergreen forest-tree plantations.

And those in the pots, as the Chinese Arbor Vitæ, may be placed among other potted plants to adorn any particular compartment, and in assemblage with green-house plants for variety.

THUYA. See THUJA.

THYMBRA, a genus furnishing plants of the under shrubby, exotic kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ* or *Labiatæ*.

The characters are: that the calyx is a one-leafed perianth, subcylindrical, keeled at the sides, two-lipped at the mouth: upper lip wider, half-three-cleft, equal, converging; lower narrower, two-parted: the corolla is ringent: tube subcylindrical: upper lip flat, straight, half-two-cleft, obtuse; lower three-cleft, almost equal, flat: the stamina have four filiform filaments, approaching by pairs: the two lower ones shorter: anthers two-lobed: lobes remote, under the upper lip of the corolla: the pistillum is a four-cleft germ: style filiform, half-two-cleft: stigmas two, acute: there is no pericarpium: calyx unchanged: the seeds four.

The species cultivated are: 1. *T. spicata*, Spiked Thymbra; 2. *T. verticillata*, Whorled Thymbra.

The first is a low shrubby plant like heath, branching out into slender woody stalks which are six or eight inches long, covered with a brown bark, and garnished with narrow acute-pointed leaves about half an inch long, sitting close to the stalks opposite; they have an aromatic odour when bruised: the stalks are terminated by thick close spikes of purple flowers, near two inches long: the calyxes are stiff and hairy; they are cut half their length into acute segments: out of these the flowers peep, with their two lips; the upper is concave and arched, the under cut into three equal portions, and these are a little reflexed: they appear in June and July, and in warm seasons are sometimes succeeded by seeds which ripen in autumn. It is a native of Mount Libanus, Macedonia, Spain, &c.

The second species has a shrubby stalk which seldom rises much more than a foot high, putting out many small woody branches, which have narrow spear-shaped leaves with many punctures; they stand opposite, and are of an aromatic flavour: the flowers grow in whorled spikes at the end of the branches: the leaves which stand under each whorl are broader than those below, and are covered with fine hairs: the flowers are purple, and sit close to the stalks: the upper lip is concave, and ends with two obtuse points; the lower ends with three equal points: these appear about the same time with the other, and in warm seasons the seeds ripen in this climate. It is a native of Spain and Italy.

Culture.—These plants may be increased by seeds, slips, and cuttings.

The seeds should be sown in the early spring in a warm border, and sheltered from bad weather by glasses; or, which is better, in pots filled with light mould, and placed in a mild hot-bed: when the plants have attained some growth they should be set out or removed into separate pots.

The slips and cuttings should be planted out in the spring and summer, and when well rooted removed where they are to grow: they also sometimes succeed by bottom offsets planted out as above.

They afford variety among other potted green-house plants.

THYME. See THYMUS.

THYMUS, a genus containing plants of the low, aromatic, perennial kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ* or *Labiatæ*.

The characters are: that the calyx is a one-leafed perianth, tubular, half-five-cleft into two lips, permanent, having the throat closed with villose hairs: upper lip wider, flat, erect, three-toothed: lower lip two-bristled, of equal length: the corolla one-petalled, ringent; tube length of the calyx: throat small: upper lip shorter, flat, erect, emarginate, obtuse; lower lip longer, spreading, wider, trifid, obtuse: middle segment wider: the stamina have four filaments, curved in, two of which are longer: anthers small: the pistillum is a four-parted germ: style filiform: stigma bifid, acute: there is no pericarpium: calyx narrowed at the neck, cherishing the seeds in its bosom: the seeds four, small, roundish.

The species cultivated are: 1. *T. Serpillum*,

Wild Thyme; 2. *T. vulgaris*, Garden Thyme; 3. *T. Mastichina*, Mastic Thyme; 4. *T. Virginicus*, Virginian or Savory Thyme.

The first has a woody, fibrous, brown, perennial root: the stems numerous, woody, branched, leafy, pubescent, commonly tinged with red: branches alternate: the leaves petioled, elliptic or ovate, obtuse, quite entire, hollow-dotted with little pellucid glands, ciliate at the base and on the petiole with a few fine white hairs; otherwise it is commonly smooth, though sometimes hairy all over: the heads of flowers terminating, roundish, with little leaves among them: the flowers pedicelled, and of a purplish red colour. It is a native of Europe, flowering in July and August.

There are several varieties; as the Broad-leaved, Narrow-leaved, Variegated-leaved, Silver-striped-leaved, Citron-scented or Lemon Thyme, Great Purple-flowered.

The second species is more hoary, higher, harder, and more woody than the first: the leaves are whiter, narrower, and the flowers smaller. It is a native of the South of Europe and Siberia, flowering from May to August.

There are different varieties; as the Broad-leaved, the Narrow-leaved, and the Variegated- or Striped-leaved Thyme.

The third is a shrub, a foot in height, or a little more: the leaves heaped on the stem, linear or even ovate, the lower hoary beneath, the upper ones smooth: whorls hirsute: the teeth of the calyx hairy, and as it were feathered. It is a native of Spain.

The fourth species has a perennial root; but the stalk is annual, rising about a foot and half high, stiff, angular, branching out towards the top: the leaves stiff, pointed, about an inch and half long, and a quarter of an inch broad in the middle, pointed at both ends, and having a strong scent of pennyroyal: the flowers are white, collected into globular heads, appearing in July; but the seeds seldom ripen in this climate. It is a native of North America.

Culture.—These plants may be easily raised from seed, by slipping the roots and branches, and by cuttings; but the seed method is seldom practised except with the second sort, or Garden Thyme: the seed should be sown in the early spring on light, rich, dry ground, which should be properly dug over, and the surface be made moderately smooth with the spade: as the seed is small, it should not be sown too thick, or be covered too deep: the seed is best sown while the ground is fresh stirred, either broad-cast on the surface, raking it in lightly, or in flat shallow drills, earthed over thinly: the plants appear in two or three weeks. It is necessary to be careful to keep them well weeded, giving occasional light waterings in dry weather; and by June they will require thinning, especially if the plants are to grow stocky, and with bushy full heads; in which case they should be set out to six or eight inches distance; when those thinned out may be planted in another place, in rows, six or eight inches asunder, giving water till fresh rooted, keeping the whole clean from weeds by occasional hoeing between them in dry days, which will also stir the surface of the earth, and much improve the growth of the plants: they will be in perfection for use in summer or early in autumn.

Sometimes the market kitchen-gardeners raise large quantities in beds, for daily supply, leaving the whole thick: when of proper growth they pull them clean up root and top together, from time to time, as wanted, and tie them in bunches for sale.

But it is always proper to thin out, or transplant a quantity in single bunches, to grow stocky and bushy for occasional supplies.

When intended to increase any particular varieties, and continue them the same with certainty, it can only be effected by slips and cuttings.

In respect to the offsets and slips, all the sorts multiply by offsets of the root and slips of the branches: the rooted slips are the most expeditious method, as the old plants increase into many offset-stems rising from the root, each furnished with fibres; and by taking up the old plants in the spring, &c. and slipping or dividing them into separate parts, not too small, with roots to each, and planting them in beds of good earth, in rows half a foot asunder, giving water directly, and repeating it occasionally in dry weather till they have taken root, and begin to shoot at top; they soon grow freely, and form good bushy plants in two or three months.

The strong slips of the branches without roots, succeed when planted any time in the early spring season in a shady border, in rows four or five inches distant, giving due waterings; and become good plants by autumn, when they may be planted out where they are to remain.

The cuttings of the young branches grow readily, the same as the slips, when planted at the same season in a shady place, and well watered.

The Common Thyme is in universal use as a pot-herb for various culinary purposes; it may also be employed in assemblage with other small plants, to embellish the fronts of flower-borders, shrubbery clumps, small and sloping banks, &c. placing the plants detached or singly,

to form little bushy tufts, and in which the variegated sorts, and the Silver Thyme and Lemon Thyme particularly, form a very agreeable variety. The Lemon Thyme is also in much estimation for its peculiar odoriferous smell. Some of each of these sorts may also be potted, in order to move occasionally to any particular places as may be required, and under occasional shelter in severe winters to preserve the plants more effectually in a lively state; likewise some of the Mastic Thyme. Spanish and Portugal Thymes are also sometimes potted for the same purpose, and to place under the protection of a garden frame or green-house in winter, to continue them in a more fresh and lively growth: and sometimes some of the smaller Thymes are sown or planted for edgings to particular beds or borders for variety, such as the Lemon Thyme, Silver-leaved and variegated sorts; also occasionally the Common Thyme; and all kept low, close, and regular, by clipping them at the sides and tops annually in the summer season.

TICKSEED-SUN-FLOWER. See COREOPSIS.

TILIA, a genus containing plants of the ornamental tree kind.

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Columniferæ*.

The characters are: that the calyx is a five-parted perianth, concave, coloured, almost the size of the corolla, deciduous: the corolla has five petals, oblong, obtuse, crenate at the tip: the stamina have numerous filaments, (thirty and more) awl-shaped, length of the corolla: anthers simple: the pistillum is a roundish germ: style filiform, length of the stamens: stigma a blunt pentagon: the pericarpium is a coriaceous capsule, globular, five-celled, five-valved, opening at the base: the seeds solitary, roundish.

The species are: 1. *T. Europæa*, European Lime Tree; 2. *T. Americana*, Broad-leaved American Lime Tree; 3. *T. pubescens*, Pubescent Carolina Lime Tree; 4. *T. alba*, White Lime Tree.

The first is a tall upright tree, with smooth spreading branches thickly clothed with alternate, petioled, heart-shaped, smooth, serrate leaves, pointed at the end, oblique at the base, glaucous beneath, and the veins, where they branch off from the nerve, being furnished with a tuft of glandular wool, as in the Laurustinus: the flowers, which are delightfully fragrant, especially at night, come forth in July, in umbels or cymes, (from three to five together,) on long axillary peduncles, with a singular, oblong, blunt, membranaceous, pale, entire bracte, nearly as long as the peduncle, and attached to it for about half its length, and falling off with it. It is a native of Europe, &c.

It is, though little used, a handsome tree, having a smooth taper straight trunk, and the branches forming a beautiful cone. The foliage also is smooth and elegant: it grows to a very large size, and affords good shade: it makes a fine detached object in parks and open lawns, planted singly: the branches are so tough as seldom to be broken by the winds, and the flowers have a delightful fragrance: the wood is soft, but capable of being turned into light bowls and dishes, &c.

There are several varieties; as the Narrow-leaved, the Broad-leaved, the Elm-leaved, the Red-twigged, the Smooth Small-leaved, the Smooth Large-leaved, the Soft Hairy-leaved, the Wrinkled-leaved, and the Striped-leaved.

The second species has the branches covered with a dark brown bark: the leaves are large, heart-shaped, ending in acute points, are deeply serrate, and of a full green on their upper side, but of a pale green and a little hairy on their under side, standing upon long slender footstalks: the petals are narrower, and have nectariums growing to their base: the flowers do not appear till late in July, a full month after the common sort. It is a native of Virginia and Canada, and was brought from New England by the name of Black Lime.

The third is a tree of much smaller growth than either of the former: the branches spread more horizontally: the leaves are smaller, and have a smoother surface; they are heart-shaped, but the midrib runs obliquely to the footstalk, so that one side of the leaf is much larger than the other; the edges are slightly serrate, and their ends run out into long acute points: the bunches of flowers stand upon long slender footstalks; the petals are narrow, and end in acute points; have each a narrow, nectarium fastened to their base on the inside, standing erect close to the petals: the flowers emit a very fragrant odour, and come out towards the end of July. It is a native of Carolina.

The fourth species has the leaves snow-white beneath, and the flowers as in the second sort, but smaller. It is a native of North America, or Hungary.

Culture.—These trees may be increased by seeds, layers and cuttings.

The seed, when ripe in the autumn, should be beaten down, keeping the green-twigged and red-twigged sorts separate; and be sown soon after, or preserved dry and sound till spring; sowing it in a bed or border of common earth, previously digging the ground, and dividing it

into four-feet wide beds; drawing the earth off the surface evenly, about an inch deep, into the alleys; then sowing the seeds thinly, touching them lightly down into the earth with the back of the spade, directly earthing them over to the above depth.

When they come up in the spring, the beds should be kept clean from weeds, giving moderate waterings in dry weather, to forward the plants in growth as much as possible, in order to be fit for planting out in nursery-rows by autumn or spring following; though, if they have shot rather weakly, they should stand another year, then be planted out in rows two feet and a half asunder, by eighteen inches distance in the lines, to remain three or four years or more to acquire a proper size for the purposes intended, trimming off the large side-branches from the lower part of the stem occasionally, to encourage their aspiring more expeditiously at top, which should be suffered to remain entire: these trees, when raised from seed, generally assume a more handsome and expeditious growth than such as are raised from layers and cuttings. When they are from about five or six to eight or ten feet high, they are of proper size for final planting out; though, when designed as forest-trees for timber, it is advisable to plant them finally while they are young, as not more than from three or four to five or six feet high.

They are all raised readily by the layer method; and for this purpose proper stools must be prepared, and the young shoots of a year or two old are the proper parts for being laid down, which should be performed in autumn or winter, by slit-laying, shortening the tops of each layer within a little of the ground: they are mostly rooted by autumn following, and fit to plant out in nursery-rows, being then managed as the seedlings.

When cuttings are employed, the strong young shoots of the year should be chosen in autumn or spring, and planted in a moist good soil; or any scarce sorts may be planted several together in pots, and plunged in a hot-bed, as they more readily strike root in that way.

These two last methods are the proper ones for raising the varieties with certainty.

These trees afford ornament and variety among other deciduous trees in the shrubbery, plantations, &c.

TINUS. See VIBURNUM.

TOAD-FLAX. See ANTIRRHINUM.

TOBACCO. See NICOTIANA.

TOLUIFERA, a genus comprising a plant of the exotic tree kind for the stove.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Terebintaceæ*.

The characters are: that the calyx is a one-leafed perianth, bell-shaped, five-toothed, almost equal, with one angle more remote: the corolla has five petals, inserted into the receptacle, of which four are equal, linear, a little longer than the calyx; the fifth twice as big, obcordate: claw length of the calyx: the stamina have ten filaments, very short: anthers longer than the calyx: the pistillum is an oblong germ: style none: stigma acute: the pericarpium is a round berry, four-celled, four-seeded: the seed single, ovate.

The species is *T. Balsamum*, Balsam of Tolu Tree.

It is a tree of large size: the bark is very thick, rough, and of a brown colour: the branches spread out wide on every side: the leaves are alternate, oblong-ovate, four inches long, and two inches broad in the middle, rounded at the base, acuminate at the end, smooth, of a light green colour, on very short strong footstalks: the flowers are produced in small axillary racemes or bunches, each on a slender pedicel: the fruit roundish, the size of a large pea, divided into four cells, each containing one oblong-ovate seed. It is a native of Spanish America; and is the tree from which the Balsam of Tolu is made.

Culture.—This tree is raised from seeds, which should be obtained from its native situation, and be sown as soon as possible afterwards in pots of light earth, plunging them in the bark-bed of the stove. When the plants have three or four inches growth, they should be potted off separately, giving them water, and replunging them in the bed. They afterwards only require to be managed as other woody stove plants.

They afford variety in stove collections.

TOOTHACH TREE. See ZANTHOXYLUM.

TORCH-THISTLE. See CACTUS.

TOUCH-ME-NOT. See IMPATIENS and MOMORDICA.

TOURNEFORTIA, a genus containing plants of the shrubby exotic kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Asperifoliæ*.

The characters are: that the calyx is a five-parted perianth, small: segments awl-shaped, permanent: the corolla one-petalled, funnel-form: tube cylindrical, globular at the base: border half-five-cleft, spreading: segments acuminate, horizontal, gibbous in the middle: the stamina have five filaments, awl-shaped, at the

throat of the corolla: anthers simple, in the throat, converging, acuminate: the pistillum is a globular superior germ: style simple, length of the stamens, club-shaped: stigma circumcised, entire: the pericarpium is a globular berry, two-celled, perforated by two pores at top: the seeds four, subovate, separated by pulp.

The species cultivated are: 1. *T. hirsutissima*, Hairy Tournefortia; 2. *T. volubilis*, Climbing Tournefortia; 3. *T. fœtidissima*, Fetid Tournefortia; 4. *T. humilis*, Dwarf Tournefortia; 5. *T. cymosa*, Broad-leaved Tournefortia; 6. *T. argentea*, Silvery Tournefortia; 7. *T. suffruticosa*, Hoary-leaved Tournefortia.

The first has a shrubby stem, somewhat scandent, branched, covered with a ferruginous shagginess: the leaves oblong, entire, nerved, hairy all over, but extremely so beneath: the spikes or racemes very much branched, stiff and straight, spreading a little: the flowers white, directed all one way. It is a native of the islands in the West Indies.

The second species has a twining woody stalk, which twists about the neighbouring trees for support, and rises to the height of ten or twelve feet, sending out several slender woody branches: the flowers are produced in branching spikes from the side and top of the branches; are small and white, and succeeded by small white succulent berries, having one or two black spots on each. It is a native of Jamaica, flowering in July and August.

The third has shrubby stems, ten or twelve feet high, sending out many branches: the leaves alternate, five inches long, two inches and a half broad in the middle, hairy on their under side, standing upon short foot-stalks: the branches are terminated by long branching spikes of flowers, ranged on one side; some of the foot-stalks sustain two, others three, others again four spikes of flowers, near five inches in length, reflexed at the top: the flowers are of a dirty white colour, small, and closely set; they are succeeded by small succulent fruit. It is a native of Jamaica.

The fourth species has low shrubby stalks, which seldom rise more than three feet high, sending out a few slender woody branches: the leaves are rough, dark green on their upper, but pale on their under surface: the flowers come out in single axillary spikes; are white, and succeeded by small succulent berries. It is a native of South America.

The fifth has the stem a fathom in height: the branches herbaceous, angular, grooved, smooth: the leaves ovate-lanceolate, long, petioled, smooth, wrinkled beneath: the flowers sessile, on one side, disposed in two rows. It is a native of Jamaica, flowering in July.

The sixth species is a shrub, scarcely the height of a man: the trunk is very short, covered with a deeply cloven bark: the branches spreading very much, hirsute: the leaves at the ends of the branches, alternate, approximating into a rose as in Sempervivum Canariense, ovate or tongue-shaped, (being narrowed into the petiole,) sessile, rounded at the end, white all over, with a silky hairiness pressed close to them: the panicle large, divided into spikes, directed one way, and rolled back: the flowers snow-white. It is a native of the shores of the sea of Ceylon, &c.

The seventh has woody stalks which rise five or six feet high, from which spring out many slender woody branches: the leaves about two inches long, and an inch broad in the middle, rounded at each end with acute points; of a dark green on their upper surface, but having a white down on their under side, and sitting close to the branches: the flowers terminating and axillary, in slender branching spikes, which are recurved; and the flowers ranged on one side of them, white, and succeeded by small succulent berries. It is a native of Jamaica.

Culture.—These plants may all be increased by seeds, which should be procured from the countries where they grow naturally, and sown in small pots filled with light earth, and plunged into a hot-bed of tanners bark. They sometimes grow the first year, but often remain in the ground a whole year: therefore, when the plants do not come up the same season, the pots should be plunged in autumn into a tan-bed in the stove, where they should remain all the winter, and in the spring be removed and plunged into a fresh tan-bed, which will soon bring up the plants if the seeds were good. When these are fit to remove, they should be each planted in a small pot, and plunged into a tan-bed, where they must be shaded from the sun till they have taken new root, and then be treated in the same way as other tender plants from the same countries, which require to be kept constantly in the bark-stove. They may also sometimes be increased by cuttings, which should be planted in pots and plunged into the bark-bed.

They afford variety in stove collections.

TOXICODENDRON. See Rhus.

TRACES, LADIES'. See Ophrys.

TRACHELIUM, a genus containing a hardy herbaceous plant of the perennial kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Campanaceæ*.

The characters are: that the calyx is a five-

parted perianth, very small, superior: the corolla one-petalled, funnel-form; tube cylindrical, very long, very slender: border patulous, small, five-parted: segments ovate, concave: the stamina have five capillary filaments, length of the corolla: anthers simple: the pistillum is a three-sided-roundish inferior germ: style filiform, twice as long as the corolla: stigma globular: the pericarpium a roundish capsule, obtusely three-lobed, three-celled, opening by three holes at the base: the seeds numerous, very small.

The species cultivated is *T. cæruleum*, Blue Throatwort.

It has a perennial (biennial) fleshy, tuberous root, sending out many fibres which spread wide on every side: the leaves about two inches long, and one inch broad in the middle, ending in acute points: the stalks rise a foot and half high, with leaves on them shaped like those at the bottom; sometimes there are two pretty large leaves, and one or two smaller from the same point, or one large and three smaller; these come out alternate, and the upper part of the stalk, immediately under the umbel, is naked, except two or three narrow leaves, which are close to the foot-stalks of the flowers; these are disposed in form of an umbel composed of many small ones: the flowers are small, and of an azure blue colour, appearing in June and July. It is a native of Italy and the Levant.

Culture.—It is raised from seeds, which should be sown in the autumn when well ripened, or in the spring, in a bed or border of light mould. And when the plants are two or three inches in height, they should be set out in nursery rows six inches apart, to remain till the following autumn, when they should be planted out where they are to remain.

They afford ornament in rock-works, and other situations where the earth is poor.

TRADESCANTIA, a genus furnishing a plant of the hardy herbaceous perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Ensatæ*.

The characters are: that the calyx is a three-leaved perianth: leaflets ovate, concave, spreading, permanent: the corolla has three orbicular petals, flat, spreading very much, large, equal; the stamina have six filiform filaments, length of the calyx, erect, villose, with jointed hairs: anthers kidney-form: the pistillum is an ovate germ, obtusely three-cornered: style filiform, length of the stamens: stigma three-cornered, tubulous: the pericarpium is an ovate capsule, covered by the calyx, three-celled, three-valved: the seeds few, angular.

The species is *T. Virginica*, Common Virginian Spiderwort, or Flower of a Day.

There are other species that may be cultivated.

It has roots composed of many fleshy fibres: the stalks smooth, rising a foot and half high: the leaves long, smooth, keeled, embracing: the flowers in clusters, composed of three large spreading purple petals; they appear early in June; and though each flower continues but one day, yet such is the profusion, that there is a succession of them through the greater part of the summer. It is a native of Virginia and Maryland, flowering in June.

There are varieties with deep blue flowers, with white flowers, with red flowers, and with purple flowers.

Culture.—They are readily increased by parting the roots, and planting them out in the autumn, or early in the spring, in a bed or border of common earth.

And also by seeds sown at the same seasons in similar situations, the plants being pricked out into other beds in the summer, and removed in the autumn to the places where they are to grow.

They afford ornament in the common borders among other flower plants.

TRAGOPOGON, a genus containing plants of the hardy, herbaceous, biennial, and perennial kinds.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Compositæ Semiflosculosæ*.

The characters are: that the calyx is common simple, eight-leaved: leaflets lanceolate, equal, alternately interior, all united at the base: the corolla compound imbricate, uniform: corollets hermaphrodite, many, exterior ones a little longer: the proper one-petalled, ligulate, truncate, five-toothed: the stamina have five filaments, capillary, very short: anther cylindrical, tubulous: the pistillum is an oblong germ: style filiform, length of the stamens: stigmas two, revolute: there is no pericarpium: calyx converging, acuminate, length of the seeds, ventriculose, at length reflexed: the seeds solitary, oblong, attenuated to both ends, angular, rugged, terminated by a long awl-shaped down-bearing stipe: down feathered, flat, with about thirty-two rays: the receptacle naked, flat, rugged.

The species are: 1. *T. porrifolius*, Purple Goat's-beard, or Salsafy; 2. *T. pratensis*, Common Yellow Goat's-beard; 3. *T. crocifolius*, Crocus-leaved Goat's-beard; 4. *T. Dalechampii*, Great-flowered Goat's-beard.

The first has a biennial root, long, tapering or round-fusiform, that and the whole plant

abounding with a sweet milky juice, which soon turns to a brown resin, from the evaporation of its watery particles: the herb smooth, glaucous, about four feet high: the stem round, erect, branching, leafy: the leaves lanceolate, scarcely waved, ending in a tapering straightish point: the flowers solitary, terminating: the stalk which supports them tapering from the calyx downwards; of a purple colour.

It is cultivated in gardens under the name of Salsafy. The roots boiled or stewed have a mild sweetish flavour. The stalks are also cut in the spring, when they are four or five inches high, and dressed like Asparagus.

The second species has a biennial root, fusiform or fleshy tapering, abounding with milk, which is sweet not acrid: the whole herb smooth and very even: the stems several, branched, eighteen inches or two feet high, leafy, round, often tinged with purple: the branches elongated into a simple naked peduncle: the leaves alternate, sessile, some radical, others embracing the stem and branches, all broad and somewhat inflated at the base, but terminating in a long narrow point, which is flaccid or apt to hang down; very generally the margin towards the bottom is more or less waved or curled: the peduncles terminating, solitary, one-flowered, not swelling out at top, but of an equal thickness throughout: the flowers large and handsome, opening at day-break, and closing before noon. It is a native of Europe and Siberia, flowering in June.

The third resembles the first, but is scarcely a foot high: the leaves are villose at the base, but become smooth by age: the flowers violet, of two rows only, but in the middle rather yellow. It is a native of Italy and the South of France, and is biennial.

The fourth species has a perennial, thick and succulent root: the stems about a foot high, sometimes less: the leaves large, thick, villose, toothed and sinuated; the upper ones often entire: from the centre of the root-leaves, which spread in a rose, rises a naked thick flower-stalk, villose and thicker in the upper part, where it terminates in a very large flower of a pale yellow or sulphur colour. It is a native of Spain, and the South of France, &c. flowering from June to October.

Culture.—The first sort is only raised from seed, which should be sown in the spring, in an open situation to remain, either broad cast and raked in, or in shallow drills eight or nine inches asunder, scattering the seeds thinly, and covering them half an inch deep; and when the plants are come up two or three inches in height, they should be thinned and weeded by hand or the hoe, leaving them eight or ten inches asunder, repeating the weeding as required during the summer, which is all the culture they require, and they will have large roots by the autumn, as September or October, when they may be begun taking up for use; and in November, when the leaves begin to decay, a quantity be preserved in sand for use in time of severe frost, when those in the ground cannot be got up.

In spring, when those remaining in the ground begin to shoot, the shoots, when a few inches high, may be cut for use, which, when quite young and tender, on being boiled, are excellent eating. A few plants should be suffered to run up to stalk every spring, to produce seeds.

The two following sorts may also be raised from seed in the same way, and the plants, when a little advanced in growth, be planted out if they are required for variety in any particular part.

The third sort may also be propagated by parting the roots in autumn and spring, and planting them where they are to remain.

The first is a culinary plant, and the others afford variety in the borders, &c.

TRAINED TREES, such young fruit-trees as are designed for walls and espaliers, being trained in the nursery to the intended form, by planting against any kind of walls, pales, reed-hedge, or other close fence; when a year old from the grafting or budding, training them in the manner of wall or espalier trees, for two, three, or more years, till they obtain a good spread of branches, and are arrived to a fruitful state, in order that those who are in haste to have their walls or espaliers covered at once with bearing trees, may have it accomplished in one season. The trees thus trained in the nursery, &c. on being planted out in autumn or spring to the places intended, cover the wall or espalier in some manner at once, and often bear fruit the ensuing summer.

In the nurseries large quantities of these sorts of trees are always kept ready trained for sale, particularly peaches, nectarines, and apricots for walls; in many places, also, cherries and plums, &c., also apples, pears, and other fruit-trees, for espaliers; and are proper to furnish the walls and espaliers of new gardens, and occasionally those of old ones, to bear fruit, till younger trees, planted untrained, become fruitful, or for supplying the places of old trees that fail, or bear bad fruit.

When it is intended to raise trained fruit-trees for walls and espaliers, a quantity of the best young plants of the respective sorts, dwarf and

half standards, of one year old, with the first shoots from the budding and grafting entire, should be planted out in autumn against some kind of fence in a free open situation, not less than four or five feet high, placing them from five or six to eight or ten feet distant, to remain for training. These in the spring following, just as they begin to make an effort for shooting, should be headed down, with a clean sloping cut upward, to within four, five or six eyes or buds of their origin, or place of insertion in the stock, especially those intended for dwarfs, and the half-standards, if worked on tall stocks; which prevents their running up too high with a single naked stem, and causes them to throw out lateral shoots from the lower part to fill the wall or espalier regularly with branches quite from the bottom upward; as they soon after push forth strong shoots from all the remaining lower buds, sufficient to give the tree its first proper formation as a wall tree, &c.; which shoots, when advanced in length in summer, should be trained along to the fence equally to the right and left, in a somewhat inclinated position at full length till next spring, when these shoots may also be cut down to six or eight inches length, to force out a further supply of more branches near the bottom, as it is proper that they should be well furnished with branches below, in order to cover the wall, &c. well at the bottom part.

The summer's shoots should be shortened in this manner; more or less the two or three first springs, as may be necessary, in order to obtain a proper spread of lower branches to give the tree its intended form; though this work of pruning short to obtain laterals may also be performed occasionally in summer, in May or early in June, on the strong young shoots of the year, cutting or pinching them down to a few eyes; but the first is the best mode.

As the supply of branches thus obtained arrive at proper lengths, in the summer they should be all trained in along close to the wall, and if any fore-right or back shoots come out, they should be rubbed off close, leaving all the well-placed side and terminal shoots in every part, and letting the whole, or as many as possible, be trained in during this season, to have a plenty to choose from in the general pruning season, laying them in close to the wall, &c. equally to the right and left, on each side of the tree, in a spreading somewhat horizontal manner, no where crossing one another but at parallel distances, and mostly all at full length during the summer's growth, to remain till the general winter or spring pruning.

In the winter pruning, where more wood was trained up in summer than appears necessary, or than can be trained in with due regularity, it should be retrenched, as well as any remaining fore-right or back shoots and other irregular growths omitted in summer, be now all pruned out, cutting them quite close to their origin. The whole should then be close nailed to the wall.

Having thus procured proper heads, they should afterwards be pruned according to the method peculiar to each respective sort, as directed under their culture, some requiring the branches to be shortened annually, others to be mostly trained at full length. See DWARF and ESPALIER TREES, PRUNING, &c.

The training of espalier trees is effected exactly in the same manner, only these may be trained as they stand in the nursery lines, in the open quarters or borders, &c. by ranging some stout stakes in the ground along one side of each tree, not in a continued straight range immediately the way of the row, but those of each tree ranged separate and obliquely, somewhat cross-ways the row as it were, that the branches of the different trees may range beside one another, and thereby have more room to extend the branches both ways, than the common distance in the nursery lines would admit, if ranged directly the way of the row.

It may be remarked that in general, unless good Trained Trees can be readily obtained, of from three or four to five or six years old, of a clean free growth, it will be better to plant entire young untrained trees of one or two years old, immediately from the nursery, putting them at once where they are to remain, managing them afterwards as the Trained Trees, to give them the proper form of head.

Some, in order to have as great a chance as possible, plant young untrained trees to remain, and Trained Trees of a bearing state, dwarfs and half-standards between, to cover the wall more effectually at once, and furnish a supply of fruit, until the young ones are trained and arrive at the bearing state; then, according as the trees of both sorts advance in that state of growth, those which appear the most prosperous are retained, and the others are gradually cut away, leaving the more thriving trees to occupy the wall wholly at last.

In most of the public nurseries, they raise Trained Trees for sale, which occupy all their close fences of walls, pales, &c. where they may be procured of almost any size, differing in price from three to five or ten shillings or more per tree, according to the sorts, age, and goodness of growth.

TRAILING ARBUTUS. See EPIGÆA.

TRAVELLER'S JOY. See CLEMATIS.

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1 *Tradescantia virginica*
Virginian Spider wort

2 *Trillium sessile*
Sessile Trillium

3 *Thalictrum aquilegifolium*
Feathered Columbine

TREE CELANDINE. See Bocconia.
TREE GERMANDER. See Teucrium.
TREE MALLOW. See Lavatera.
TREE PRIMROSE. See Oenothera.
TREFOIL, SHRUBBY. See Ptelia.
TREFOIL, SNAIL. See Medicago.

TREILLAGE, a sort of rail work consisting of ranges of light posts and railings, for the purpose of training espalier trees to, and occasionally for wall trees, where the walls do not admit of nailing the branches immediately against it; likewise for training wall-trees in forcing frames, &c. They are made in different ways, for use and ornament, as well as of different dimensions, from four or five to six or seven feet high.

For common espalier fruit-trees in the open ground, they are absolutely necessary, and may either be formed of common stakes and rails nailed together, or of regular joinery work.

The cheapest and the easiest, and soonest made Treillage for common espalier trees, is that formed with any kind of straight poles or stakes of underwood, as cut in the coppices, being then cut into proper lengths, and driven into the ground in a range at foot distances, all of an equal height, and then railed along the top with the same kind of poles, to preserve the whole straight and firm in a regular position. See Espalier.

And to render these still stronger, two or three horizontal ranges of rods may be nailed along the back part of the uprights, a foot or eighteen inches asunder.

The more elegant and ornamental Treillages are formed with regularly squared posts and rails of hard timber, neatly planed and framed together; having for this purpose deal or oak posts, uniformly worked two or three inches square; but if the main posts are of oak, it will be of advantage in respect to strength and durability, fixing the main posts in the ground ten or twelve feet asunder, with smaller ones between, ranging the horizontal railings from post to post in three or more ranges; the first about a foot from the bottom, a second at top, and one or two along the middle space, and, if convenient, one between each of the intermediate spaces; then fixing thin slips of lath, or the like, upright to the horizontal railing as far as the branches of the trees extend, ten inches or a foot asunder; and painting the whole white in oil colour, to render it more ornamental and durable. In training the trees, their branches are tied both to the railing of the Treillage, and the upright laths, according as they extend in length on each side. In either of the above cases, for an espalier, five feet is generally of sufficient height, as, if much higher, the winds, having greater power, will loosen and displace them.

Where walls are built with large stones with the joints irregular and far asunder, and which do not afford opportunities, like brick walls, for nailing properly in the regularity which is required, a neat Treillage is sometimes uniformly erected all along close to the wall, to train and nail or tie the branches to in a regular manner.

These may be made of coarse pieces of battens, railings, &c. or of such as are wrought in a neat manner, according to the convenience and taste of the person who has them.

In frames and stoves, where wall trees are intending for forcing, as they are planted both against the back wall, and occasionally in a detached low range forward towards the middle or front space, Treillages are indispensably necessary upon which to arrange the branches of the trees in a regular expansion, not to train them immediately close to the wall of the flues of that department, but detached several inches, and formed with light neat squared upright battens, and small horizontal rails, uniformly framed together in a light open manner.

TREILLIS, a term sometimes employed to signify the same as treillage. See Treillage.

TRILLIUM, a genus furnishing plants of the low, tuberous-rooted, flowery, perennial kind.

It belongs to the class and order *Hexandria Trigynia*, and ranks in the natural order of *Sarmentaceæ*.

The characters are: that the calyx is a three-leaved perianth, spreading: leaflets ovate, permanent: the corolla has three petals, subovate, a little bigger than the calyx: the stamina have six awl-shaped filaments, shorter than the calyx, erect: anthers terminating, oblong, length of the filaments: the pistillum is a roundish germ: styles filiform, recurved: stigmas simple: the pericarpium is a roundish berry, three-celled: the seeds many, roundish.

The species are: 1. *T. cernuum*, Drooping Trillium; 2. *T. erectum*, Upright Trillium; 3. *T. sessile*, Sessile-flowered Trillium.

The first has a perennial tuberous root: the stem is erect, a foot high, simple, round, slightly striated, smooth: the leaves three together, terminating, on short footstalks, spreading, rhomboidal, pointed, entire, veiny, smooth, paler beneath: the flowers solitary, among the leaves, without bractes: the flower-stalk round, a little waved, smooth. It is a native of North America.

The second species has a taller stalk: the three

leaves are placed at a distance from the flower, which stands upon a long footstalk, and is erect: the petals are purple, larger, and end with sharper points. It is a native of Virginia, Canada, &c.

The third has a purple stalk: the three leaves grow at the top like the first; but they are much longer, and end in acute points: the petals are long, narrow, and stand erect; are of a dark brownish red: the calyx leaves are streaked with red: the leaves mottled. It grows in Carolina and Virginia.

Culture.—These plants may be increased by seeds, which should be sown on a shady border as soon as they become ripe in the autumn: when they appear in the spring, the plants should be kept clean from weeds, and in the autumn following be planted out where they are to remain and flower.

They succeed best in a light soil, where the situation is rather shaded.

They afford variety in such places.

TRIUMFETTA, a genus furnishing plants of the shrubby and herbaceous kinds.

It belongs to the class and order *Dodecandria Monogynia*, and ranks in the natural order of *Columniferæ*.

The characters are: that the calyx is a five-leaved perianth: leaflets lanceolate, arilled below the tip, deciduous: the corolla has five petals, linear, erect, obtuse, concave, bent back, awned below the tip: the stamina have sixteen filaments, equal, ascending, length of the corolla, awl-shaped, erect; anthers simple: the pistillum is a roundish germ: style length of the stamens: stigma bifid, acute: the pericarpium is a globular capsule, fenced on every side with hooked prickles, four-celled: the seeds two, convex on one side, angular on the other.

The species cultivated are: 1. *T. Lappula*, Prickly-seeded Triumfetta; 2. *T. annua*, Annual Triumfetta.

The first rises with an upright stem to the height of six or seven feet; towards the bottom it becomes woody, and at top divides into four or five branches: the leaves placed alternately the whole length of the stem, about two inches and a half long, and almost two inches broad near the base, divided almost into three lobes toward the top, and the middle division ending in an acute point; they are veined on their under side, are covered with a soft brown down, and have several nerves running from the midrib to the sides; their upper side is of a yellowish green, and a little hairy; their borders are acutely but unequally serrate, and stand upon footstalks an inch in length: the branches are terminated by long spikes of flowers, which come out in clusters from the side of the principal footstalk, at the distances of about an inch: the flowers are small, the petals narrow and of a yellow colour; they are succeeded by burry capsules, round, and with long prickles placed on every side. It is a native of Jamaica, Martinico, &c. flowering in July and August.

The second species is an annual plant, rising about two feet and a half high, and sending out several branches on every side: the leaves ending in long acute points; some are heart-shaped, others have an angle on each side towards the point; they are from three to four inches long, and almost as much in breadth where broadest; they stand upon very long footstalks, and are notched on their edges: the flowers come out in long loose spikes at the top of the plant; are small and yellow. It is a native of India, flowering in September.

Culture.—This is increased by seeds, which must be procured from its native place, and be sown on a hot-bed, or in pots plunged in the bark-bed of the stove: when the plants have one or two inches growth, they should be removed into separate pots, replunging them in the bark-bed till well re-rooted.

They afterwards require to be kept constantly in the stove, or hot-house, and to have the management of other ligneous plants of the stove kind.

They produce variety in stove collections.

TROPÆOLUM, a genus furnishing plants of the herbaceous, annual, and perennial, trailing and climbing kinds.

It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Trihilatæ*.

The characters are: that the calyx is a one-leafed perianth, five cleft, from upright spreading, acute, coloured, deciduous; the two lower segments narrower; horned at the back with an awl-shaped, straight, longer nectary: the corolla has five petals, roundish, inserted into the divisions of the calyx; two upper sessile; the others lower, with oblong, ciliate claws: the stamina have eight awl-shaped filaments, short, declining, unequal: anthers erect, oblong, rising: the pistillum is a roundish germ, three-lobed, striated: style simple, erect, length of the stamens: stigma trifid, acute: the pericarpium berries (or nuts) somewhat solid, three, on one side convex, grooved and striated; on the other angular: the seeds three, gibbous on one side, angular on the other, roundish, grooved and striated.

The species cultivated are: 1. *T. minus*, Small Indian Cress, or Nasturtium; 2. *T. majus*, Great Indian Cress, or Nasturtium.

Painted by Syd. Edwards

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Engraved by F. Sanfom

1 *Trollius Americanus*
American Globe flower

2 *Tropæolum majus*
Greater Nasturtium

The first has an herbaceous, trailing stem: the leaves almost circular, smooth, grayish: the flowers axillary, on very long peduncles; composed of five acute-pointed petals, the two upper large and rounded, the three under narrow, jointed together at bottom, and lengthened out into a tail two inches long.

There are varieties with deep orange-coloured flowers inclined to red, with pale yellow flowers, and with double flowers.

The second species is larger in all its parts: the borders of the leaves are indented almost into lobes; and the petals are rounded at the top. The fruit consists of three berries, becoming juiceless when ripe, fungous, deeply grooved and wrinkled, gibbous on one side, angular on the other, narrowing upwards. It begins to flower in July, and continues till the approach of winter.

There are varieties with pale yellow flowers, orange-coloured flowers, and the double-flowered.

They are both natives of Peru, and commonly esteemed to be annual plants, though they may be continued through the winter, if they are kept in pots, and sheltered in a green-house or glass case, in like manner as the variety with double flowers.

The stalks will climb six or eight feet high, when they are trained up, and thus the flowers make a good appearance; but when they trail upon the ground, they will spread over the neighbouring plants and become unsightly: the flowers are frequently eaten in salads; they have a warm taste like the garden cress, and hence the plant has its common name of Nasturtium; they are likewise used for garnishing dishes: the seeds are pickled, and by some are preferred to most pickles for sauce, under the false name of capers.

Culture.—These plants in all the single varieties may be increased by seeds, which should be sown in the spring in patches where they are to flower in the borders, or in drills in the garden.

They afterwards only require to be kept free from weeds, and to be well supported by sticks.

The double variety must be increased by planting cuttings of the branches in pots of light mould in the early part of summer, placing them in the shade, and giving frequent light waterings: those planted early may be rendered more forward by being plunged in a moderate hot-bed.

It requires to be protected in the green-house in the winter, being well supported with sticks.

They all afford variety in the borders, clumps, &c. in the summer, and the double sorts among potted plants.

TROWEL, GARDEN, a trowel made of iron, in a hollow or scooped form, which is an useful implement in taking up numerous sorts of small plants and bulbous roots, and replanting them in pots, sowing in patches, and various other similar light works: it should be from six to twelve inches long in the plate, and half as broad, and fixed on a short handle, to hold with one hand. From its being hollowed semicircularly, it is remarkably handy in removing many sorts of small plants with a ball or lump of earth whole about their roots, so as not to feel their removal; lifting several sorts of bulbous flower roots, after the flowering is past in summer; planting bulbs in patches or little clumps about the borders, and also for digging small patches in the borders for sowing hardy annual flower-seeds on; likewise for filling mould into small pots in planting any sort of plants, stirring the surface of the mould in pots, and fresh earthing them when necessary: it is also highly useful for filling in earth about plants in hot-beds, and under frames, or any small compartments where a spade cannot be readily introduced.

They should be had of different sizes to suit different purposes.

TRUMPET FLOWER. See BIGNONIA.

TRUMPET HONEYSUCKLE. See LONICERA.

TUBEROUS ROOTS, such as consist of one or more swelled or knobbed tubers, of a solid fleshy substance.

In this tribe are comprised many plants of the ornamental flowery kind, and some esculents of the kitchen garden; as in the former anemone, ranunculus, filipendula, many sorts of iris, aconitum, pæony, orchis, cyclamen, winter-aconite, day lily, &c. some also with bulbo-tuberous roots, as gladiolus, polyanthes, or tuberose, ophrys, &c. and of the esculent tuberous roots are the potatoe and Jerusalem artichoke; all of which plants are principally perennial in their roots, being perpetuated annually by offsets.

TUBS, a sort of boxes calculated for containing large green-house exotics, and other potted plants and trees when grown too large for the pots.

Green-house plants, particularly in some of the larger-growing sorts, in a few years growth become too large to be contained longer in pots, even in those of the largest size; which being sometimes both too small for the increased roots of the plants, and of insufficient strength to admit of moving them with the plants, as large orange and lemon-trees, myrtles, oleanders, and other tree kinds, as well as large plants of the great American aloe, &c.: when any of these, or other similar large-growing trees and plants, are advanced considerably in size in their general

growth; some proper strong tubs of larger dimensions than the pots containing the plants should be prepared in proper time, in which to shift them.

These tubs are made by the coopers proper for this purpose, somewhat in the garden-pot form, a little wider at top than at bottom, from a foot and half to two and a half deep; the width in proportion; constructed of the strongest thick staves and bottoms, and well hooped with iron, and with two iron handles at top, by which to remove them; these handles being strong and generally hooked, especially in very large tubs, in order to receive a pole in each occasionally, that the tub and plant together may be more readily moved: the bottom of the tubs have auger holes bored in different parts, at regular distances, by which to discharge the superfluous moisture after watering, &c.

In tubbing large-grown plants, they should be removed from their present pots, with the balls of earth about the roots entire; and having earthed the bottom parts of the tubs, the plant should be set in with its whole ball of earth, filling up properly around, and an inch or two over the top of the ball with more fresh mould, and then watering. See SHIFTING PLANTS and POTTING.

TULIPA, a genus furnishing plants of the bulbous-rooted, flowery perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Coronariæ*.

The characters are: that there is no calyx: the corolla bell-shaped: petals six, ovate-oblong, concave, erect: the stamina have six awl-shaped filaments, very short: anthers quadrangular, oblong, erect, distant: the pistillum is a large germ, oblong, from three-cornered round: style none: stigma three-lobed, triangular: angles protuberant, bifid, permanent: the pericarpium is a three-sided capsule, three-celled, three-valved: valves ciliate at the edge, ovate: the seeds numerous, flat, incumbent in a double row, semicircular, separated by similar flocks.

The species cultivated are: 1. *T. Gesneriana*, Common Garden Tulip; 2. *T. sylvestris*, Wild or Yellow Tulip.

The first has the stem nearly upright or bending a little, taller and stronger than in the second, from a foot to eighteen inches in height: the leaves three, four, or five, embracing, doubled, lanceolate, acute, nerved, glaucous; the lowest near the bulb two inches and a half wide, the others gradually narrower: the flower large, erect, in a wild state most commonly red with a black base: petals ovate, blunt, smooth: the anthers commonly very dark-coloured or black; the stigma three-lobed, each lobe bifid, bent back, and the edge curled back: the capsule superior, of a triangular prismatic form, three-grooved, transversely striated: the valves having a partition in the middle, and ciliate at the sutures with white silky vibrissæ turned inwards: the seeds obovate, narrowed towards the navel, flat on both sides, margined, rufescent, fastened horizontally in a double row to the central margin of the partitions. Before the fruit is fully ripe, the vibrissæ in this genus are glued together into three thin membranes, which being interposed between the columns of seeds, make the unripe capsules six-celled. It is a native of many parts of the Levant.

It is distinguished from the other, according to Martyn, by "its pubescent scape, spreading sweet-smelling corolla, the earliness of its flowering, and the smallness of its size."

In respect to the varieties, the editor of Miller's Dictionary observes, that "the old authors divided Tulips into *Præcoces* or Early-blowers, and *Serotinæ* or Late-blowers, with an intermediate division of *Dubiæ Mediæ*, Doubtful or Middle-blowers, which flowered between the two others, and for the most part rather belonged to the late-blowers. Modern florists," he says, "have almost neglected the early-blowers." The first sort, according to Miller, "are not near so fair, nor do they rise half so high as the late ones; they are chiefly valued for appearing early in the spring: some of them will flower the middle of March in mild seasons, if planted in a warm border near a wall or other shelter, and others will succeed them, so that they will keep flowering until the general season for these flowers is come, which is towards the end of April.

"The several varieties of these early-blowing Tulips rise to different heights in their stems, and scarcely any two of them are equal. The Duke Van Toll, which is one of the first that appears in the spring, is generally very short-stalked, and the others in proportion to their earliness are shorter than those which succeed them; and the late-blowers are all considerably longer in their stems than any of the early-blowers.

"The late-blowing Tulips producing much finer flowers than the early ones, have engrossed almost the whole attention of the florists. It would be to little purpose to enumerate all the varieties, since there is scarcely any end of their numbers, and what some value at a considerable rate, others reject; and as there are annually many new flowers obtained from breeders, those which are old, if they have not very good properties to recommend them, are thrown out and despised."

It is observed that "modern florists in Holland and Flanders, and our English florists from them, boast a prodigious variety of late-blowing Tulips." And that "Mr. Maddock of Walworth, in his catalogue of flowers for 1792, has no less than about 665 of these admired beauties, all ranged under their proper families and colours, with their names and prices: besides the early sorts, *double tulips*, *parrot-tulips*, *French tulips*, and *breeders*.

It is added that "the late-blowers are distributed into five families: 1. *Primo Baguets*; very tall; fine cups with white bottoms, well broken with fine brown, and all from the same breeder: 2. *Baguet Rigauts*; not quite so tall, but with strong stems, and very large well-formed cups with white bottoms, well broken with fine brown, and all from the same breeder: 3. *Incomparable Verports*; a particular kind of *Bybloemens*, with most perfect cups, very fine white bottoms, well broken with shining brown, and all from the same breeder; some of these are from two to five guineas a root: 4. *Bybloemens*; with bottoms white, or nearly so, from different breeders, and broken with variety of colours; those of the Verports are cherry and rose: 5. *Bizarres*; ground yellow, from different breeders, and broken with variety of colours.—These barbarous terms, used by the Dutch florists, are, it is said, a mixture of Dutch and French. Baguet is from the French Baguette, a rod or wand, so named from its tall slender stem. Bizarre is also French; and the Tulips of that family have the name from the variety and irregularity of their colours. Rigauts are probably from the name of some eminent florist, Rigaud. The other terms are Dutch.—Breeders are of one colour, and when broken produce new varieties."

"The properties of a fine variegated late Tulip, according to the best modern florists, are," he says, "these: 1. the stem should be strong, upright, and tall, about thirty inches high: 2. the flower should be large, composed of six petals, proceeding a little horizontally at first, and then turning upwards so as to form an almost perfect cup, with a round bottom, rather wider at the top: 3. the three outer petals should be rather larger than the three inner ones, and broader at their base: all the petals should have the edges perfectly entire; the top of each should be broad and well rounded; the ground colour at the bottom of the cup should be clear white or yellow; and the various rich stripes which are the principal ornament of a fine flower should be regular, bold, and distinct on the margin, and terminate in fine broken points, elegantly feathered or pencilled: 4. the centre of each petal should contain one or more bold blotches or stripes, intermixed with small portions of the original colour, abruptly broken into many irregular obtuse points. Some florists," he adds, "are of opinion that the central stripes or blotches do not contribute to the beauty of the Tulip, unless they are confined to a narrow stripe exactly down the centre; and that they should be perfectly free from any remains of the original colour: it is certain that such flowers appear very beautiful and delicate, especially when they have a regular narrow feathering at the edge: but it is unanimously agreed, that the Tulip should abound in rich colouring, distributed in a distinct and regular manner throughout the flower, except in the bottom of the cup, which should indisputably be of a clear bright white or yellow, free from stain or tinge, in order to constitute a perfect flower. The Double and Parrot Tulips are," says he, "in no sort of esteem among the florists."

The second species has the bulb ovate, gibbous: the stem quite simple, nearly upright, round, smooth, leafy in the middle, attenuated at the base: the leaves alternate, slightly embracing, lanceolate, acute, keeled, glaucescent: the flower always yellow, greenish on the outside: the petals elliptic-lanceolate, without any nectary: the filaments flatted: the anthers terminating, versatile, oblong: the germ three-cornered: stigma sessile, three-cornered. A native of the South of Europe, &c., flowering in April.

"It has most of these characters in common with the Garden species; but the circumstances that abundantly distinguish this are; the narrow leaves, the nodding flower, the hairiness at the base of the stamens and on the tips of the petals, and especially the simple obtuse form of the stigma, which is totally different from that of the Garden Tulip: the flower too is fragrant; the pollen yellow, not black; and the anthers remarkably long. In the Flora Danica they are represented short and round."

Culture.—All the different sorts of tulips may be increased by offsets from the roots, and by sowing seeds to produce new varieties. The offsets should be separated from the old roots in June, on taking them up when the flowering is over, planting them in nursery-beds, in rows six inches apart, and to the depth of three, four, or five, in the beginning of autumn. They may also in the old root, be planted in beds, or in the borders or other parts where they are to remain and blow, in patches of four or five, placed irregularly; and to have a succession, they may be planted at different times; they are usually planted with a blunt dibble: the new roots should always be planted by themselves.

The early and late sorts should likewise be each put in, in places by themselves, and it is advised that the roots of the early blowing kinds should be planted the beginning of September, in a warm border, near a wall, paling, or hedge; as, when they are put into an open spot of ground, their buds are in danger of suffering by morning frosts in the spring. The soil for these should be renewed every year, where people intend to have them fair. The best soil for this purpose is that which is taken from a light sandy pasture, with the turf rotted amongst it, and to this should be added a fourth part of sea sand. This mixture may be laid about ten inches deep, which will be sufficient for these roots, which need not be planted more than four or five inches deep at the most.

The offsets should not be planted amongst the blowing roots, but in a border by themselves, where they may be set pretty close together, especially when they are small; but these should be taken up when their leaves decay, in the same manner as the blowing roots, otherwise they would rot if the season should prove very wet, as they are not so hardy as the late blowers, nor do they increase half so fast, so that more care is requisite to preserve the offsets of them.

When these sorts come up in the spring, the earth upon the surface of the beds or borders should be gently stirred and cleared from weeds; and as the buds appear, if the season should prove very severe, it will be of great service to cover them with mats, for want of which, many times they are blighted, and their flowers decay before they blow, which is often injurious to the roots, as is also the cropping of the flowers soon after they are blown; as their roots, which are formed new every year, are not at that time arrived to their full magnitude, and are of course deprived of proper nourishment or support.

When these flowers are blown, if the season should prove very warm, it will be proper to shade them with mats, &c., in the heat of the day; and when the nights are frosty, they should be covered in the same manner, by which means they may be preserved a long time in beauty; but when their flowers are decayed, and their seed-vessels begin to swell, they should be broken off just at the top of the stalks, as when they are permitted to seed it injures the roots very greatly.

In these sorts when the leaves are decayed, which is usually before the late blowers are out of flower, their roots should be taken up, and spread upon mats in a shady place to dry; after which they should be cleared from filth, and put in a dry place where vermin cannot come to them, until the season for planting them again, being very careful to preserve every sort separate, that it may be known how to dispose of them at the time of planting.

For this purpose, it is a good method to have large flat boxes made, which are divided into several parts by small partitions, each of which is numbered the same as the divisions of the beds; so that when a catalogue of the roots is made, and the numbers fixed to each sort in the beds, nothing more is necessary, in taking up the roots, but to put every kind into the division marked with the same number in the bed. This saves a great deal of trouble in making fresh marks every time the roots are taken up, and effectually answers the purpose of preserving the kinds separate and distinct.

In raising these plants from seed, it is, from the time of sowing, seven or eight years before they produce flowers; and after all, they at first appear only single-coloured, often requiring two, three, or more years longer before they break into different colours or variegations; so that the tediousness of raising seedling tulips to a flowering state often deters from the undertaking. It is, however, the method by which all the fine varieties were first obtained, and by which new varieties are still annually gained; as many persons sow some every year, in expectation that after the first six or seven years a new show of flowers will be produced, out of which many new varieties may annually discover themselves in each parcel. It is by this process the Dutch are so famous for furnishing such an infinity of fine varieties, supplying almost all other countries.

In effecting this business, great care should be used in the choice of the seed: the best is that which is saved from breeders which have all the good properties before related, for the seeds of striped flowers seldom produce any thing that is valuable; and the best method to obtain it is to make choice of a parcel of such breeding Tulip roots as are wished to save seeds from, and place them in a separate bed from the breeders, in a place where they may be fully exposed to the sun, planting them at least nine inches deep, as when they are planted too shallow their stems are apt to decay before their seed is perfectly ripened: the flowers should be always exposed to the weather, as when they are shaded with mats, or any other covering, it prevents their perfecting the seed. About the middle of July, according to the season, the seeds will be fit to gather, as shown by the dryness of their stalks and the opening of the seed-vessels, at which time they may be cut off, and the seeds be preserved in the pods till the season for sowing, being careful to put them up in a dry place, otherwise they will be subject to

mould, and be rendered useless. The beginning of September is the proper season for sowing the seed; for which there should be provided a parcel of shallow seed-pans, or boxes, which should have holes in their bottoms to let the moisture pass off; these should be filled with fresh sandy earth, laying the surface very even, upon which the seeds should be sown thinly as regularly as possible; some of the same light sandy earth being sifted over them, about half an inch thick. These boxes or pans should be placed where they may have the morning sun till eleven o'clock, in which situation they may remain until October, at which time they should be removed into a more open situation, where they may enjoy the benefit of the sun all the day, and be sheltered from the north winds, where they should remain during the winter season; but in the spring, when the plants appear with grassy leaves, they should be again removed to their first situation; and if the season be dry they must be refreshed with water while the plants remain green; but as soon as their tops begin to decay, no more should be given. The boxes should be placed in a shady situation during the summer season, but not under the drip of trees. The weeds and moss should be kept constantly cleared off from the surface of the earth in the boxes, and a little fresh earth be sifted over them soon after their leaves decay; and at Michaelmas they should be fresh earthed again, and as the winter comes on be again removed into the sun as before, and treated in the same manner, until the leaves decay in the spring, when the bulbs should be carefully taken up, and planted in beds of fresh sandy earth, which should have tiles laid under them, to prevent their roots from shooting downward, which they often do when there is nothing to stop them, and are destroyed. The earth of these beds may be about five inches thick upon the tiles, which will be sufficient for nourishing the roots while young. The distance of planting them need not be more than two inches, nor should they be planted above two inches deep. Toward the end of October, it will be proper to cover the beds over with a little fresh earth about an inch deep, which will preserve the roots from the frost, and prevent moss or weeds from growing over them; and when the winter is very severe, it may be proper to cover the bed either with mats or peas-haulm, to prevent the frost from entering the ground, as these roots are much tenderer while young, than after they have acquired strength. In the next spring the surface of the ground should be again gently stirred to make it clean, before the plants come up; and when the spring proves dry, they must be frequently refreshed with water in small portions during the time of their growth; and when the leaves are decayed, the weeds should be taken off, and the beds covered with fresh earth, as before, which should also be repeated again in the autumn. When the bulbs have been managed in this way two years, they should in the summer following, when their leaves decay, the roots being by that time considerably improved in growth, be again taken up, and planted in a fresh prepared bed, in drills three or four inches asunder, in which to remain two years longer; then, at the decay of the leaf, be again planted out into fresh beds, in rows as before, where they should be let remain to blow, being afterwards ordered as the flowering bulbs. When they are in full flower, they should be examined, in order to mark such of them as discover the best properties, that they may be separated from the others at the proper lifting season, and be replanted in beds by themselves for breeders; removing them annually at the proper season into different beds of opposite or contrary soils, as one year in poor hungry earth, the next in a much richer mould; continuing them so till they break into variegations and stripes of different colours, which are the only modes by which it can be assisted. When the leaves and flower-stems are decayed and withered, and the roots have ceased growing and drawing nourishment from the earth, it is the proper period for lifting or taking the old roots out of the earth, to reserve them till autumn for planting, being preserved in the manner directed above.

The early dwarf sorts are the most proper for forcing for early blowing, and also for being placed in glasses, in rooms, &c.

The second species may be managed in the same manner. They are all highly ornamental flowers, from their much varied and most beautiful colours.

TURF, the green surface or sward cut from pastures, &c., for the purpose of laying down grass-grounds; as lawns, plats, bowling-greens, &c.

It is flayed with the turfing-iron, in regular lengths of two or three feet, and a foot wide; and being properly laid down close and regular in the places intended, it immediately forms an even grass sward, which quickly strikes root in the ground, in proper growth and verdure. This sort of work may be performed any time in autumn, winter, and spring, in open weather, or occasionally in summer, in a moist season, but the autumn is the best season. The best turf is mostly procured from fine close fed pastures, commons, or downs, &c., where the sward is close and even; or that of any grass

field of similar close firm sward, where the grass is not rank and coarse, nor abounding in weeds, or much overrun with the common wild daisy.

In the operation of cutting, a line should be drawn tight lengthways of the grass-ground, and then the cutting-racer be stricken into the surface of the sward, close to the line, pushing it along so as to cut or score the sward in a straight cut the length of the line, about an inch and half deep; and having thus raced out one length, the line should be moved a foot width further to race out another length as before, proceeding in the same manner to a third, and so on to as many lengths of the line, in foot widths, as may be necessary; then, by the same means, the sward is to be raced cross-ways in yard distances, and thus the proper widths and lengths are formed. After the sward has been thus raced out, it should be flayed, or cut up with the turfing-iron, beginning at one side, cutting evenly longways the whole length of each raced line, about an inch or inch and half thick; a person following immediately after to roll them up separately in yard lengths, grass side inward, as close and tight as possible: having thus cut up one range, proceed with another in the same manner, and so continue with the whole. As the turfs are rolled up, they should be piled close and regular together, ready for carrying away. When cut by the hundred, as is often the case where large quantities are required, they are commonly piled up in tens; four below, three next, then two, and one at top, for the more ready reckoning of the number wanted.

TURFING, the operation of laying down turf. In preparing the ground for this purpose, it should, where loose, be well trodden, or occasionally rammed; then be properly levelled with the spade, and afterward raked smooth; when it is ready for laying. In laying the turfs, they should be unrolled regularly on the ground, each in its place, making them join close edge to edge, so as to form at once a close even sward; beating the whole down close and even afterwards with heavy wooden beaters, to settle the roots of the grass close to the earth, as well as to form the surface equally close, firm, even, and smooth; the turf thus soon strikes root below, and grows above, without any further care in this part of the business, except occasionally beating down any swelling inequalities, and sometimes rolling it with a heavy iron roller. Sometimes when turf is laid in the summer, or early part of autumn, in dry hot weather, it will shrink and open considerably at the joinings, and assume a decayed-like appearance. In this case, a few good waterings would be serviceable; but should this be omitted, the first heavy rain will mostly recover the whole effectually, and swell the sward, so as to close all the chasms, and revive the verdure of the grass plants, when a heavy rolling should be given, to settle the whole firm and even, and give the surface a neat appearance. The principal circumstance to be regarded in this sort of work, is to have the surface of the ground well levelled before the turfs are laid down.

In respect to the after-culture of ground formed with turf, it is chiefly to give occasional mowings, from the spring through the summer till October, and occasionally poling and rolling the surface to keep it even and level. The mowings in these cases should constantly be performed before the grass gets too high a growth, so as to injure the surface appearance. See GRASS-GROUND.

TURFING-IRON, an implement made use of for flaying or cutting up grass turf from land for the above purpose: it is formed with an iron plate for the cutter, six to seven or eight inches wide, a little rounding forward at the edge, which is thin and sharp for cutting, but thickening gradually behind to the upper part, where it is forged to a long bent iron handle, the bending so formed as to admit of the plate or cutter resting flat with its back on the ground, in the proper position for readily cutting or flaying the turf evenly, all a regular depth; the handle at top being either formed of iron with an opening like the top of a spade, or a socket in which to fix a short wooden handle of that kind. It is represented at fig. 4. in the annexed plate. In using it in cutting the turf, the workman takes hold with one hand in the top handle, the other below, with the latter guiding the tool in the proper position, whilst the upper hand is placed against his knee, &c., which assists him in thrusting it forward into the ground evenly under the sward; and thus he proceeds along in a regular manner, moving the tool gradually along at each stroke, level and even, at an equal depth.

TURKEY-BERRY TREE. See CORDIA.

TURKEY WHEAT. See ZEA.

TURK'S CAP. See LILIUM.

TURNEP. See BRASSICA.

TURNERA, a genus comprising a plant of the woody, flowering, exotic kind, for the stove.

It belongs to the class and order *Pentandria Trigynia*, and ranks in the natural order of *Columniferæ*.

The characters are: that the calyx is a one-leafed perianth, funnel-form, deciduous: tube oblong, erect, cylindric-angular: border erect, five-parted: segments lanceolate, length of the

tube: the corolla has five petals, obcordate, acuminate, flat, from upright spreading: claws narrow, inserted into the tube of the calyx: the stamina have five awl-shaped filaments, shorter than the corolla, inserted into the tube of the calyx: anthers acuminate, erect: the pistillum is a conical germ: styles three: filiform, length of the stamens: stigmas capillaceous-multifid: the pericarpium is an ovate capsule, one-celled, three-valved: receptacles annexed to the valves longitudinally, linear: the seeds numerous, oblong, obtuse.

The species cultivated is *T. ulmifolia*, Elm-leaved Turnera.

It has a shrubby stem, eight or ten feet high, sending out branches on every side the whole length: the leaves ovate-lanceolate, two inches and a half long, and an inch and half broad, rough on their upper side, and of a lucid green; their under side has many strong veins, and is of a lighter green, the edges are serrate: the flowers sit close upon the footstalks of the leaves, having two pretty large leafy appendages to the calyx: the corolla is large, and of a bright yellow. It is a native of the West Indies.

There is a variety with narrow leaves, which rises with a shrubby stalk to the height of eight or ten feet, with branches less slender and stiff than in the broad-leaved sort: the leaves narrow-lanceolate, hairy, near three inches long, and about three quarters of an inch broad, terminating in acute points, obtusely serrate on their edges, and standing upon very short footstalks; when rubbed, they emit a disagreeable odour: the flowers are of a pale yellow: the petals large and oval, with the tails or claws twisted and joining: they are not so large or of so bright a yellow as in the true Elm-leaved sort. It is a native of Jamaica.

Culture.—These plants are easily raised from seed, which should be sown in the spring, in pots, and plunged in the bark-bed, or any other hot-bed, under glasses; and when the plants are come up two or three inches in height, they should be planted separately in small pots, plunging them in the stove of the bark-bed, to forward them a little in growth: they may afterwards be placed in any part of the stove, and be managed as other stove exotic plants. They are also capable of being increased by cuttings, planted in pots, and forwarded in the above manner. They afford a good variety among stove plants.

TURNSOLE. See CROTON.

TURPENTINE TREE. See PISTACIA.

TUTSAN. See HYPERICUM.

TWAY-BLADE. See OPHRYS.

ULEX, a genus furnishing shrubby plants of the thorny kind.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a two-leaved perianth, permanent: leaflets ovate-oblong, concave, straight, equal, a little shorter than the keel: upper leaflet two-toothed, lower three-toothed: the corolla papilionaceous, five-petalled: standard obcordate, emarginate, erect, very large: wings oblong, obtuse, shorter than the standard: keel two-petalled, straight, obtuse, converging by the lower margin: the stamina have diadelphous filaments, simple and nine-cleft: anthers simple: the pistillum is an oblong germ, cylindrical, hirsute: style filiform, rising: stigma obtuse, very small: the pericarpium is an oblong legume, turgid, scarcely longer than the calyx, straight, one-celled, two-valved: the seeds few, roundish, emarginate.

The species cultivated are: 1. *U. Europæus*, Common Furze, Whin, or Gorse; 2. *U. nanus*, Dwarf Furze; 3. *U. Capensis*, Cape or African Furze.

The first is a well known shrub, which has its branches very close, deeply furrowed, woolly or hirsute, full of thorns, which are stretched out, branched, angular, very sharp, smooth, evergreen, leafy, frequently flower-bearing; according to Withering, awl-shaped, a little bowed downwards, woolly at the base, yellow at the ends: the leaves at the base of the spines and spinules, solitary, awl-shaped, terminating in sharp yellowish thorny points, somewhat rugged, often hirsute, deciduous: the peduncles axillary, single or two together, one-flowered, villose: the flowers of a fine yellow or gold colour. It is a native of Britain.

The second species is much lower than the common sort, with decumbent branches: the spines horizontal or partly deflexed: the bractes very small, brown, often scarcely apparent, pressed close to the calyx: the calyx more silky and less tomentose, with the teeth very conspicuous, deeply cut and distant: corolla little longer than the calyx, of a less flaming colour; legume rough-haired. It is found with the other chiefly on dry elevated heaths, but by no means so general; flowering from August to October.

The third has a woody and hard stem, covered with a greenish bark when young, but afterwards becomes grayish: the branches slender and woody. It has not produced any flowers in this climate. It is a native of the Cape, where it usually grows to the height of five or six feet.

Culture.—These plants may be increased from seeds. These in the first sort should be sown in the autumn or spring, in any light mould, where the plants are to remain. They are likewise sometimes sown in drills in nursery-beds, to be transplanted afterwards while very young; but the first is the better practice, as they do not remove well. Hedges of this plant are best raised by sowing them in drills an inch deep where they are to remain.

In the second and third sorts the seed should be obtained from abroad, and be sown in pots of fine mould, plunging them in the hot-bed; when the plants are up a few inches in height, they should be removed into separate small pots, being afterwards managed as other shrubs of the green-house kind.

The last sort is difficult to raise, either by layers or cuttings.

The first sort and varieties afford ornament in shrubberies, and the two latter among potted plants of the green-house kind.

ULMUS, a genus containing plants of the deciduous timber-tree kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Scabridæ*.

The characters are: that the calyx is a one-leafed perianth, turbinate, wrinkled: border five-cleft, erect, coloured within, permanent: there is no corolla: the stamina have five filaments, (sometimes four or eight,) awl-shaped, twice as long as the calyx: anthers four-grooved, erect, short: the pistillum is an orbicular germ, erect: styles two; shorter than the stamens, reflexed: stigmas pubescent: the pericarpium is an oval berry, large, juiceless, compressed, membranaceous-winged, one-celled: the seed one, roundish, slightly compressed.

The species are: 1. *U. campestris*, Common Elm; 2. *U. suberosa*, Dutch Elm; 3. *U. montana*, Broad-leaved Elm, or Wych-Hasel; 4. *U. Americana*, American Elm; 5. *U. nemoralis*, Hornbeam-leaved Elm; 6. *U. pumila*, Dwarf Elm.

The first is a great, high tree. The bark of the young trees and the boughs of the older trees are smooth and very tough, and will strip or peel from the wood a great length without breaking: the bark of the body of the old tree, as the trees grow in bigness, tears or rends, which makes it very rough. The innermost wood is of a reddish yellow, or brownish colour, and curled; and after it is dry, very tough and hard to cleave. The wood next the bark or sap is white. Before the leaves come forth, the flowers appear, about the end of March, growing on the twigs or branches, closely compacted or thrust together, of a red colour; after which come flat seeds, more long than broad, for the most part falling away before, or shortly after the leaves spring forth, but some hang on a great part of the summer: the leaves dark green, the middle-sized ones two inches broad and three inches long, rough or harsh on both sides, indented about the edges, and many times crumpled, having a nerve in the middle, and many smaller nerves growing from it, on one side always longer than on the other. It is a native of Europe and Barbary.

There is a variety called the Narrow-leaved Elm, which is like the other, but much less and lower: the leaves are usually about two inches and a half long, and an inch or an inch and quarter broad; indented about the edges, and having one side longer than the other, and being harsh on both sides like the other. It is called in the nurseries, the English Elm. It is stated by Dr. Smith, as the opinion of Mr. Crowe, that this is the origin of all the cultivated varieties: and Miller says there are several other varieties, but not worth noticing; among these is that with variegated or blotched leaves Gilpin also makes mention of the Weeping Elm.

The second species is chiefly remarkable for its quick growth, and fungous rough bark: the leaves are very large, and harsh on both sides, not so unequal at the base as the others: the flowers, according to Schkuhr and Willdenow, have only four stamens. It is a native of Europe, and is often called the Cork-barked or the Dutch Elm, as it was introduced from Holland at the beginning of king William's reign: the wood is of very inferior quality.

The third has the bark of the branchlets smooth and even: the leaves are wider than in the preceding, less harsh, and acuminate: the

flowers are on longer peduncles, and spread out loosely: the fruit is roundish: the wood is less solid: the trunk soon divides into long wide-spreading winged branches; and when at its full growth seldom rises to above one third of the height of the first species: it flowers when even under thirty feet high, whilst that seldom flowers till it has gained a much greater age and height: the branches are very brittle: the flowers scentless, from six to fifteen in a corymb, on long pedicels: it grows however to be a very great tree, and also very high, especially in woods among other trees: the bark on the outside is blacker than that of the first, and is also very tough, so that when there is plenty of sap, it will strip or peel from the wood of the boughs from the one end to the other, a dozen feet in length or more without breaking: the timber is in colour nearly like the first: it is not so firm or strong for naves, but will more easily cleave: the branches or young boughs are grosser and bigger, and spread themselves broader, and hang more downwards: the seed is somewhat bigger: the leaves are much broader and longer than any of the kinds of Elm, usually three or four inches broad, and five or six inches long, also harsh on both sides, indented about the edges, nearly resembling the leaves of the Hasel; the one side of them is most commonly longer than the other.

The variety termed the Smooth-leaved Elm is in bigness and height like the first, but the boughs grow as those of the Wych Hasel do, hanging more downwards than those of the common Elm: the bark is blacker than that of the first kind, but will also peel from the boughs: the flowers and seeds are like those of the first: the leaves also, in form, are like that, but smooth in handling on both sides: the wood is said to be more desired for naves of carts than that of the first.

The fourth species has three varieties, according to the Kew catalogue: the first is the Red or Canada Elm, which grows in its native country to a vast size: the leaves are ovate, wrinkled and scabrous, broader than those of our Dutch or Wych Elms, smoother and of a much more lively green: the branches are red, whence it has the name of Red Elm. It grows very fast in this climate.

In the second variety, or the White Elm, which is so named from the whiteness of the branches, the leaves are scabrous, but oblong; and, according to Gronovius, having narrower leaves than the Red, and the trunk beset at intervals with twigs closely clustered together below the boughs. Boats are made from the bark of it.

The third, or the Drooping or Weeping Elm, is distinguished by its oblong smoothish leaves and its pendent branches.

Martyn observes that the American differs from the European Elm in having the leaves equally, or, as Gronovius expresses it, quite simply or singly serrate. It is a native of the forests of Virginia and other parts of North America.

The fifth species, or the Hornbeam-leaved Elm, is also a native of North America.

The sixth species has the branches more slender than in the other species, divaricating, and of a grayish ash-colour: the leaves alternate, some simply, others unequally, others again doubly serrate, smoother than in the first, equal or unequal at the base, less so, however, than in the others, and the petioles a little longer: both petioles and twigs are smooth: the stipules rust-coloured, membranaceous-bristle-shaped: the seeds on short peduncles, collected into sessile globular umbels; the surrounding membrane is almost orbicular, cut but not acuminate, with the teeth of the cut very shortly curved in; it is smooth, very tender, and finely veined, pale gray: the seed itself is also gray, and ripens in May, if not sooner: the wood is very hard and tough, gray, remarkably waved with transverse lines of a deeper colour, larger fibred, and when exposed to the air becomes yellower than Oak, and is preferable to it: the ashes exported from Riga, under the name of Waidasche, are made entirely from the wood of this and other Elms, burnt in brick furnaces: the root is beautifully variegated and fit for the use of the turner, &c.: the bark does not readily peel off, and therefore is not used for making ropes: it is said, in Southern Russia, to often contend with the Oak in stature.

There is a variety with both young and old branches winged and rendered irregular with compressed fungous excrescences of the bark variously interrupted; and in mountain rocks there is a variety which has shorter, thicker branches, winged with fungous excrescences of the bark.

Culture.—In these trees it is effected in different ways; as by seed, suckers, layers, and grafting. The seed, when perfectly ripened, may be collected and sown in the autumn or spring, in four-feet-wide beds, half an inch deep; that which is kept to the spring being preserved by drying it well, out of the sun, then putting it up close till towards autumn, when it should be mixed with sand, to preserve it more effectually through the winter; when about the middle of February it should be sown as above. The plants should afterwards be carefully shaded, watered, and kept clean from weeds. The plants

should have one or two years growth in the seed-bed, and then be planted out in nursery-lines, in rows two or three feet asunder, and the plants fifteen or eighteen inches distant in each row, giving them the common nursery care, and training them for the purposes intended. If for standards, for timber, or ornamental plantations, they should be trained each to a single stem, and as they advance in height clearing the stems from all lateral shoots, leaving only the very small twigs, just to draw and detain the sap, for the better increase of the stem; suffering the leading top-shoot to remain entire, as also the principal branches of the head; but those designed for hedge-work, &c., should be let branch out all the way, and become feathered to the bottom, or as low as may be requisite for the purposes intended, only trimming them occasionally with the knife or garden shears, to give them the intended form. When the trees have had four or five years growth, and are from four or five to six, eight, or ten feet high, they are fit for planting out where they are to remain.

The suckers which most of the sorts send up from the roots, but especially the English and Dutch sorts should be taken up carefully with root-fibres, in autumn, winter, or spring, trimming them for planting by cutting them down at top to six or eight inches, placing them in small trenches or drills, five or six inches deep, one row in each, half a foot apart, and the drills about half a yard asunder; giving waterings in spring and summer; letting them remain two years, to form good roots, then planting them in wide nursery-rows, and managing them as directed for the seedlings.

The layers of all the sorts may easily be made by previously preparing a quantity of stools to produce shoots, situated near the ground: the proper season for laying them down is in the autumn, winter, or early in the spring, performing it by slit-laying; and as soon as the whole are layed and moulded in, every layer should be lopped with a knife, down to one eye above the ground. In this way they readily take root in the spring and summer following, shooting at top sometimes two or three feet long by the autumn, when they should be detached from the stools, and be planted in nursery-rows, two feet or a yard asunder, and half a yard distant in the rows: when they begin to shoot they should be trained with one leading shoot only, as the seedling Elms, managing them in the same manner.

In the grafting method all the varieties of elms may be increased and continued distinct, which should be done upon stocks of the Wych Elm, raised from seed, suckers, or layers, though the seedling stocks are preferable. For which purpose some rows of Wych Elms should be allotted for stocks, which, after having two years growth in the nursery-lines, will be fit to graft on: when about the beginning of February, the cuttings of the young moderate shoots of the best English Elm, or any other variety, should be inserted into the stocks by the method of whip-grafting, putting them in as low as possible, for which the earth should be removed away a little down to each root, then cutting off the head of the stock, within two or three inches of the bottom; the grafts be inserted one in each stock, as above, binding them close, and claying them well; then drawing the earth up about and over the clay, the more effectually to secure it from falling off by the effects of frost or other causes: when they begin to shoot they should be trained with only one leading shoot, so that if they fork at top into two or more the weakest should be taken off, leaving the best shoot for the leader; displacing all large side-shoots from the stems, and letting the tops or leading shoots remain always entire, as also the general upper branches of the heads.

These trees are highly useful, both for timber and in the way of ornament, when planted out singly on large open spaces; likewise for being clipped, or cut into particular forms, and as forming hedges in various situations.

UMBRELLA TREE. See MAGNOLIA.

URENA, a genus comprising plants of the woody perennial exotic kind.

It belongs to the class and order *Monadelphia Polyandria*, and ranks in the natural order of *Columniferæ*.

The characters are: that the calyx is a double perianth: outer one-leafed, five-cleft: segments wider: inner five-leaved: leaflets narrow, angular, permanent: the corolla has five petals, oblong, wider at the tip, blunt with a point, narrower at the base, growing to the tube of stamens: the stamina have numerous filaments, united at the bottom into a tube, at top free: anthers roundish: the pistillum is a roundish germ, five-cornered: style simple, length of the stamens, ten-cleft: stigmas headed, hairy, reflexed: the pericarpium is a roundish capsule, echinate, five-cornered, five-celled, or soluble into five close cells: the seeds solitary, on one side roundish, on the other angular-compressed.

The species cultivated are: 1. *U. lobata*, Angular-leaved Urena: 2. *U. sinuata*, Cut-leaved Urena.

The first rises with an upright stalk upwards of two feet high, which becomes woody towards the autumn. It sends out a few side branches

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1 *Valeriana rubra*
Red Valerian

2 *Veronica Sibirica*
Siberian Speedwell

which are taper, stiff, and have a dark-green bark: the leaves about two inches and a quarter broad, dark-green above, and pale-green beneath, upon pretty long footstalks: the flowers axillary, solitary, sessile, shaped like those of the Mallow, but small and of a deep blush colour. It is a native of China, flowering here in July and August.

The second species has a suffruticose stem, upright, three feet high, with ascending branches: the leaves sinuate-palmate, with obtuse sinuses, serrate, rough, alternate, petioled, having a single glandular pore on the middle rib underneath: the flowers are rose-coloured, small, subsolitary, axillary. It is a native of the East Indies.

Culture.—These plants may be increased by seeds, which should be sown on a hot-bed, or in pots plunged into it, in the early spring season. When the plants have some growth, they should be removed into separate pots, being replunged in a fresh hot-bed, requiring afterwards the same management as tender exotic plants. When placed in the stove in the spring, they ripen seeds the first year, but otherwise in the second, and seldom continue longer.

They afford variety among other stove plants.

URTICA, a genus furnishing plants of the hardy herbaceous kind.

It belongs to the class and order *Monoecia Tetrandria*, and ranks in the natural order of *Scabridæ*.

The characters are: that in the male flowers the calyx is a four-leaved perianth: leaflets roundish, concave, obtuse: the corolla petals none: nectary in the centre of the flower, cup-shaped, entire, narrower below, very small: the stamina have four awl-shaped filaments, length of the calyx, spreading, each within each calyx-leaf: anthers two-celled: female flowers either on the same or a distinct plant: the calyx is a two-valved perianth, ovate, concave, erect, permanent: there is no corolla: the pistillum is an ovate germ: style none: stigma villose: there is no pericarpium: calyx converging: the seed one, ovate, blunt, compressed, shining.

The species cultivated are: 1. *U cannabina*, Hemp-leaved Nettle: 2. *U. Canadensis*, Canada Nettle: 3. *U. nivea*, Chinese or White-leaved Nettle.

The first has a perennial root: the stems five or six feet high: the leaves oblong, deeply cut into three lobes, which are acutely indented on their edges, and placed on long petioles: the flowers axillary in long cylindrical catkins: males on the lower part, females on the upper. It is a native of Siberia, flowering in July.

The second species has also a perennial root: the stems two feet high: the flowers in axillary branching aments; appearing towards autumn, but seldom followed by seeds in this climate. It is at first male only, but afterwards has male and female flowers on the same plant. It is a native of Canada and Virginia.

The third is a perennial plant, sending up many stalks from the root, which rise three or four feet high: the leaves are four inches long, and two inches and a half broad, serrate, of a deep green on their upper side, but very white on their under; having five longitudinal veins; they stand upon very long footstalks: the flowers axillary in loose aments, and not succeeded by seeds in this climate. It is a native of the East Indies.

Culture.—These plants may be increased by parting or slipping the roots in the autumn or early in the spring, and planting them out where they are to remain.

The third sort is rather tender, and should have a dry situation where it is warm and sheltered, or be kept in pots to be sheltered under frames, or in the green-house, during the severity of the winter season.

The two first sorts afford variety in the borders and clumps of pleasure grounds, and the last among potted plants.

VALERIANA, a genus containing plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Triandria Monogynia*, and ranks in the natural order of *Aggregatæ*.

The characters are: that there is scarcely any calyx; a superior margin: the corolla a nectariferous tube on the lower side, gibbous: border five-cleft: segments obtuse: the stamina three, or fewer (in one species four): filaments awl-shaped, erect, length of the corolla: anthers roundish: the pistillum is an inferior germ: style filiform, length of the stamens: stigma thickish: the pericarpium a crust not opening, deciduous, crowned: the seeds solitary, oblong.

The species cultivated are: 1. *V. rubra*, Common or Broad-leaved Red Valerian; 2. *V. angustifolia*, Narrow-leaved Red Valerian; 3. *V.*

Calcitrapa, Cut-leaved Valerian: 4. *V. Phu*, Garden Valerian; 5. *V. tripteris*, Three-leaved Valerian; 6. *V. montana*, Mountain Valerian; 7. *V. Celtica*, Celtic Valerian: 8. *V. tuberosa*, Tuberous-rooted Valerian; 9. *V. Pyrenaica*, Pyrenean Valerian; 10. *V. olitoria*, Common Corn-Salad, or Lamb's Lettuce.

The first has woody perennial roots, as thick as a man's finger, spreading very wide: the stems about three feet high, round, smooth, grayish, hollow: at each joint are two (sometimes three) smooth, spear-shaped leaves, near three inches long, and an inch broad; the upper part sends out branches by pairs, which, with the principal stem, are terminated by red flowers growing in corymbs. It is a native of France, Switzerland, Italy, &c. flowering all the summer and autumn.

The second species has the root not so large as in the first sort: the stems two feet high or more, branching on each side from the root to within six inches of the top: the leaves three or four inches long, but as narrow as those of flax: the upper part of the stem naked, and terminated by a compact corymb of bright red flowers, smaller than those of the former. It is a native of the mountains of France, Switzerland, &c.

The third is an annual plant: the lower leaves, which spread on the ground, are cut into many obtuse segments: the stalks, when the plants are in good ground, rise near a foot and half high, but upon dry stony soils not half so high, and when they grow out of the joints of old walls, not more than three inches in height; are hollow, smooth, and round, sending out branches by pairs from the upper joints: the segments of the pinnatifid leaves are very narrow: stem and branches terminated by tufts (corymbs) of flowers shaped like those of the fourth sort, but smaller and tinged with flesh-colour at the top. It is a native of the South of France, &c. flowering early in the spring.

It varies with the lower leaves pinnatifid.

The fourth species has thick roots, fleshy, jointed, spreading near the surface in a very irregular manner, crossing each other, and matting together by their small fibres: many of the root-leaves entire, others divided into three, five, or seven, obtuse lobes, of a pale green and quite smooth: the stems three or four feet high, hollow, sending out lateral branches by pairs: the stem-leaves opposite at each joint, composed of four or five pairs of long narrow leaflets, terminated by an odd one: the stem and branches terminated by corymbs of small white flowers. It is a native of Silesia, Barbary, &c. flowering from May to July, with the odour of the flowers very pleasant.

The fifth has a perennial root, long, unequal, brownish, strong-smelling: the root-leaves oblong-cordate, bluntish, smooth, obtusely serrate-toothed, on long petioles; the two first of these that come out are more inclined to roundish, and are only slightly crenate: the stem upright, undivided, about a foot high: the stem-leaves two or three pairs, smooth, ternate, on short petioles: leaflets confluent at the base, lanceolate, acute, unequally subserrate, the middle one larger than the others; they vary much, being gash-serrate, crenate, or even quite entire; the uppermost are sometimes lanceolate-linear and quite entire, sometimes pinnate with five leaflets: the flowers numerous, white, in loose corymbs. It is a native of the Alps of Switzerland, flowering here from March to May.

The sixth species agrees in stature and habit with the preceding; but this is more tufted, and has the root commonly creeping horizontally, more divided, and not smelling so strongly: all the leaves are acute, unequally serrate or toothed and smooth; the root-leaves are on long petioles, and more or less attenuated at the base towards the petiole: the stem-leaves vary in number, are on short petioles, and rather oblong: the stem is upright, simple, a foot or eighteen inches high: the flowers in a corymb, whitish or purplish. It is a native of Switzerland, Austria, &c. flowering here in June and July.

The seventh species has a perennial root, black, oblique, with long fibres, smelling very strong, aromatic, caulescent at top and scaly with the remains of the deciduous leaves; it is often in tufts with an upright stem, four or five inches high: all the leaves are quite entire and obtuse; the root-leaves subovate, and attenuated into the petiole at the base; stem-leaves two, opposite, linear and sessile, about the middle of the stem, but there are sometimes none: the stem slender, simple, terminated by a few small whitish flowers in a corymb. It is found in Switzerland, flowering in June.

The eighth species has roots perennial, and tuberous, by which it is easily distinguished. It is a native of the South of Europe, flowering in May and June.

There is a variety with the roots in the form of an olive.

The ninth species has a perennial fibrous root, from which come out many heart-shaped leaves, on petioles more than a foot in length; they are four inches over each way, bluntly serrate, smooth, and of a bright green on their upper surface, but pale and a little hairy underneath: the stalks rise three feet high, are hollow, channelled, and send out opposite branches towards the top: the stem-leaves opposite,

shaped like the lower ones, but a little pointed; and frequently at the top there are ternate leaves standing upon short foot-stalks: the stem and branches are terminated by umbels of pale flesh-coloured flowers, having very short spurs. It flowers in June, and is a native of the Pyrenees.

The tenth has a small annual, fibrous, pale brown root: the stem dichotomous, somewhat spreading, from four inches to a span, and even a foot or more in height (in gardens); round, grooved, or angular, tender, often tinged with purple on one side: the leaves glaucous, pale, obovate-lanceolate or rather linear-tongue-shaped: the bottom leaves many, usually entire, but sometimes very slightly toothed near the base, somewhat spreading, rather succulent, smooth, veiny, and a little wrinkled, from three-quarters of an inch to two inches in length: the stem-leaves opposite at each subdivision, sessile, remote, usually more toothed than the bottom leaves: both these and the stem are ciliate or fringed at the edge with fine white hairs: the flowers are very small, of a pale blueish colour, and collected into a close little corymb, protected by an involucre. It is a native of Europe and Barbary, flowering in April and May. It is used in salads in the early spring and winter, under the name of Corn Salad, or Lamb's Lettuce.

There is a variety, which is smaller, with jagged leaves.

Culture.—The two first sorts may be increased by parting the roots, and planting them out in the autumn or spring season where they are to grow.

They may also be raised from seed sown at the same times, in the situations where the plants are to grow.

The third may likewise be raised from seeds, by sowing them as above, without any trouble.

The fourth may be increased by parting the roots, and planting them out in the autumn on fresh ground where they are to grow.

The fifth may be raised in the same way, being allowed good room as it spreads.

The three following sorts are more difficult to preserve, requiring a stony soil and cold exposure.

The ninth sort may be raised from seeds sown in a moist shady border soon after they are ripe, managing the plants as in the first sort.

The last sort, when cultivated for the purpose of salads, should be sown in the latter end of summer, or beginning of autumn, in an open place where it is to grow; the plants being afterwards thinned out by hoeing, and kept clean from weeds; when they will be fit for use very early in the spring while quite young.

All the sorts except the last may be introduced in the borders for the purpose of variety, and most of them continue many years.

The last is used as an early spring salad herb.

VENUS'S COMB. See SCANDIX.

VENUS'S FLY-TRAP. See DIONÆA.

VENUS'S LOOKING-GLASS. See CAMPANULA.

VENUS'S NAVEL-WORT. See CYNOGLOSSUM.

VERATRUM, a genus containing plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Polygamia Monoecia*, and ranks in the natural order of *Coronariæ*.

The characters are: that in the hermaphrodite there is no calyx, unless the corolla be considered as such: the corolla has six petals, oblong, lanceolate, thinner at the edge, serrate, permanent: the stamina have six awl-shaped filaments, pressing the germs, more spreading at the tips, shorter by half than the corolla: anthers quadrangular: the pistillum has three erect germs, oblong, ending in scarcely apparent styles: stigmas simple, patulous: the pericarpium three capsules, oblong, erect, compressed, one-celled, one-valved, gaping inwards: the seeds many, oblong, blunter at one end, compressed, membranaceous, fastened in a double row: male flower on the same plant, below the hermaphrodite—the calyx, corolla, and stamina, as in the hermaphrodite: the pistillum an indistinct, vain rudiment.

The species cultivated are: 1. *V. album*, White-flowered Veratrum, or White Hellebore; 2. *V. nigrum*, Dark-flowered Veratrum; 3. *V. luteum*, Yellow-flowered Veratrum.

The first has a perennial root, composed of many thick fibres gathered into a head: the leaves oblong-ovate, ten inches long, and five broad in the middle, rounded at the end, and having many longitudinal plaits: the stems three or four feet high, branching out on every side almost their whole length: under each of these branches is placed a narrow plaited leaf, and these diminish in size as they are near the top of the stem: the branches and principal stem are terminated by spikes of flowers set very close together, of a greenish white or herbaceous colour; appearing in July. It is a native of Greece.

The second species has a perennial root like the first sort: the leaves are longer and thinner, plaited in like manner, but are of a yellowish green colour, and appear sooner in the spring: the stalks also rise higher: it has fewer leaves, and does not branch out into so many spikes: the flowers are of a dark red colour, with the petals spread open flat; appearing almost a

month sooner. It is a native of Austria and Siberia.

The third has a large tuberous root: the leaves oblong, having several longitudinal furrows, or plaits; they are four or five inches long, and two broad in the middle, and spread themselves on the ground; between these comes out a single stem, near a foot high, having a very few small leaves or sheaths placed on it alternately: the flowers are produced at the top, in a single thick close spike; are small, and of a yellowish white colour, appearing in June. It is a native of North America.

Culture.—These plants may be increased by seed and parting the roots.

The seed should be sown in the autumn or early spring upon a bed or border of light earth, or in a box filled with the same sort of mould. When the plants are come up in the spring keep them clear from weeds, and refreshed with water occasionally when the season is hot and dry; and in the following autumn, when the leaves decay, take them up carefully without injuring the roots, and plant them out about half a foot square in a fresh bed of light mould; and when they have remained in it till fit for flowering, they should be removed into the borders, clumps, or other parts. This is however a tedious method, as they seldom flower in less than four years; therefore the root method is mostly had recourse to.

The roots may be divided in autumn when the leaves decay, and be planted out in a light fresh rich mould where they are to grow; they should not be removed oftener than once in about four years. The roots should not be parted too small.

These plants have a fine effect in the middle of large borders, clumps, and other similar situations.

VERBASCUM, a genus furnishing plants of the hardy annual, biennial, and perennial kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Luridæ*.

The characters are: that the calyx is a one-leafed perianth, five-parted, small, permanent: segments erect, acute: the corolla one-petalled, wheel-shaped, a little unequal: tube cylindric, very short: border spreading, five-parted: segments ovate, obtuse: the stamina have five filaments, awl-shaped, shorter than the corolla: anthers roundish, compressed, erect: the pistillum is a roundish germ: style filiform, length of the stamens, inclined: stigma thickish, obtuse: the pericarpium is a roundish capsule, two-celled, two-valved, opening at top: receptacles half ovate, fastened to the partition: the seeds numerous, angular.

The species cultivated are: 1. *V. Boerhaavii*, Annual Mullein; 2. *V. Blattaria*, Moth Mullein; 3. *V. Thapsus*, Great Mullein; 4. *V. phlomoides*, Woolly Mullein; 5. *V. Lychnitis*, White Mullein; 6. *V. sinuatum*, Scollop-leaved Mullein; 7. *V. ferrugineum*, Rusty Mullein; 8. *V. Phœniceum*, Purple Mullein; 9. *V. Myconi*, Borage-leaved Mullein.

The first has an annual root: the stem from three to four feet high: the leaves sessile but not decurrent, spatulate, narrower at the base, sinuate but scarcely lyrate, almost naked above, somewhat tomentose beneath: the spike loose, terminating, with the flowers sessile, not crowded very much together, but several to each bracte: the corollas are yellow, with the stamens and pistils purple: the flowers have an agreeable scent at a little distance; but if smelt to long, or too near, it becomes less pleasant; they appear in June and July. It is a native of the South of Europe.

The second species has an annual fusiform root: the stem about three feet high, erect, branched, leafy, angular, smooth: the leaves obovate-oblong, doubly-serrate, smooth, embracing: root-leaves sublyrate: the racemes terminating, glandular-hairy, stiff, many-flowered: the flowers peduncled, solitary, yellow streaked more or less with purple, having each a single ovate bracte at the base of the peduncle. It is a native of the South of Europe, Germany, Switzerland, &c.; and is very ornamental, flowering from July to November, or even later in mild weather.

The third has a biennial root, spindle-shaped: the stem erect, simple, stiff, and straight, from three to five feet high, leafy, woolly, angular, winged: the leaves alternate, decurrent, oblong, nearly entire, very thickly clothed on both sides with white branched intricate villose hairs: the spike terminating, erect, cylindrical, many-flowered: the flowers sessile, closely set, bright yellow, sometimes but rarely white. It is a native of Europe and Siberia, flowering in July and August.

The fourth species has a biennial root: the stem erect, spiked, very tomentose: the leaves ovate, not at all cordate, crenate; the lower ones on a petiole which is flat above; the upper ones sessile, half embracing but not decurrent: the raceme spike-shaped, with scattered lanceolate bractes; within each of which are four flowers, the middle ones blowing first, then the lowest, and lastly the two lateral ones. It is a native of Italy, Germany, and the South of France; flowering in June and July.

The fifth has a biennial root: the stem erect, seldom more than three feet high, stiff and

straight, angular, woolly, leafy, terminating in a panicle very much branched: the leaves elliptic-oblong, somewhat wedge-shaped, crenate, closely woolly beneath, but nearly smooth on the upper-side, netted-veined; the radical ones attenuated at the base: the stem-leaves ovate, sessile, but not decurrent: the branches of the panicle racemed, many-flowered: the flowers pedicelled, in bundles, cream-coloured with yellow filaments and saffron-coloured anthers. It is remarkable for its straight wand-like angular stem and cream-coloured flowers, which are produced in great numbers in a compound clustered terminating raceme. It is a native of Europe.

The sixth species has a biennial root: the radical leaves repand, or obtusely sinuate-pinnatifid: stem-leaves oblong, waved, decurrent a little at the base on each side: branch leaves ovate or cordate, a little decurrent; the first of these are opposite, the rest alternate: the flowers sessile, glomerate, in an interrupted spike. It is a native of the South of France, Italy and Barbary; flowering in July and August.

The seventh has a perennial root: the bottom leaves are ovate-oblong, indistinctly crenate, (doubly crenate,) dark green above, pale green beneath, standing upon pretty long footstalks: the stalk rises three or four feet high, branching out on each side, and has a few sharp-pointed small leaves on the lower part, sitting close to the stalk: the flowers are disposed in a long loose spike on the upper part of the stalk; they come out upon short slender pedicels, three or four from the lower joints; above these there are two at each joint, and at the top they are single; they are of a rusty iron colour, and larger than those of the common sort; they appear in July and August. It is a native of the South of Europe.

The eighth species has also a biennial root: the radical leaves ovate, subsessile, naked, even, wrinkled, scarcely crenate: the stem erect, simple, two feet high: the branches from the lowest axils, erect, simple, length of the stem, all angular, subpubescent with hairs clammy at the tip: the stem leaves cordate, sessile, smooth, wrinkled and veined: the raceme of all terminating, simple, a foot long: the peduncles simple, solitary, one-flowered. It is a native of the South of Europe.

The ninth has a perennial root, composed of slender fibres: the leaves, which spread flat on the ground, are of a thick fleshy substance, of an ovate shape, indented on their edges, woolly, and of a dark green colour; they are sessile or subsessile, embrace the crown of the root, and lie over each other; they continue in verdure all the year, but in winter change to a much darker green: from among these leaves arise several scapes or naked slender stalks, about four inches high, which divide into three or four pedicels at the top, hairy and of a brown-purplish colour, each sustaining one large flower, of a fine blue, so deeply divided as to appear to be five-petalled: the segments are oval, obtuse, and spread open flat, like the Auricula: the flowers are large in proportion to the size of the plant, of a blueish purple colour, and highly ornamental, appearing in May, and continue successively in blossom for several months. It is a desirable plant to cultivate, especially for decorating rock-work. It is a native of the Pyrenees.

Culture.—These plants may all be increased by seeds, and offsets taken from the roots.

The well ripened seeds should be sown in the autumn or early spring in a bed of light mould, or in the borders or other parts where they are to remain, covering them lightly in. When the plants are up a few inches in height, in the bed method, they should be removed into nursery-rows till the autumn, when they must be removed to where they are to remain.

The annual sort is however best sown at once where the plants are to grow, which is best done in patches.

The offsets of all the perennial sorts should be taken off in the autumn, or very early in the spring, and be planted out where they are to grow. This is better than afterwards transplanting them.

They are all hardy plants, that succeed in almost any soil.

They afford a good effect in their different foliage, and sweet scent of their flowers, in the large borders, clumps, and other parts of pleasure grounds; the larger sorts being placed backwards in them.

VERBENA, a genus containing plants of the hardy herbaceous and tender exotic kinds.

It belongs to the class and order *Diandria Monogynia*, (*Didynamia Gymnospermia*), and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a one-leafed perianth, angular, tubular, linear, five-toothed, the fifth toothlet truncate, permanent: the corolla is one-petalled, unequal: tube cylindrical, straight for the length of the calyx, then widening and curved in: border spreading, half five-cleft: segments rounded, almost equal: the stamina have two or four filaments, bristle-shaped, very short, lying within the tube of the corolla; two of them shorter (when there are four:) anthers curved in, as many as there are filaments: the pistillum is a four-cornered germ: style simple, filiform, length of the tube: stigma obtuse: the pericarpium is very slender, and scarcely manifest, or almost none: calyx con-

taining the seeds: the seeds two or four, oblong.

The species cultivated are: 1. *V Indica*, Indian Vervain; 2. *V. supina*, Trailing Vervain; 3. *V. orubica*, Betony-leaved Vervain; 4. *V. Jamaicensis*, Jamaica Vervain; 5. *V. Mexicana*, Mexican Vervain; 6. *V. globiflora*, Globe-flowered Vervain; 7. *V. bonariensis*, Cluster-flowered Vervain; 8. *V. hastata*, Halberd-leaved Vervain; 9 *V. triphylla*, Three-leaved Vervain.

There are many other species that may be cultivated for variety.

The first is an annual plant, very much resembling the fourth sort, but easily distinguished from it by the stem and branches being smooth, except the base of the leaves and the part of the branches between the leaves, which are ciliate: the leaves also are much narrower, being truly lanceolate and drawn to a point at both ends: the spike is the same, but the colour of the corolla is purple. It is a native of Ceylon, flowering in August.

The second species has a biennial root (annual): the stalks near two feet high, branching out greatly: the leaves sessile: the flowers disposed in long loose spikes singly at the end of the branches; they are of a light blue colour, and large. It flowers in July and August, and is a native of Spain, Portugal and Algiers.

The third arises with a shrubby stalk near three feet high, divided into three or four branches: the leaves oblong-ovate, placed by pairs, deeply serrate, deep green above, but hoary beneath; their footstalks are short, and have leafy borders running from the base of the leaves: the flowers grow in thick terminating spikes about a foot in length; are large, of a fine blue colour, and have small acute-pointed leaves intermixed with them; they come out in June and July. It is biennial, and a native of South America.

The fourth species has the stem three or four feet high, very much branched and diffused, and being suffrutescent at the base it seems to be more than annual: the stem and branches rough with hair: the leaves opposite, ovate, obtuse or acute, serrate, gradually and for a considerable length attenuated at the base: from the axil between two opposite branches comes forth a fleshy spike, a foot long, unequally cylindrical, stiff and green: the flowers blow in succession, beginning at the bottom, very few together, violet-coloured, with the throat and long slender incurved tube white. It is a native of Jamaica, Barbadoes, &c.

The fifth has a shrubby stalk, which rises five or six feet high, and divides into several branches: the leaves sessile, oblong, serrate, ending in acute points, two inches long, one inch broad near the base, of a light green colour on both sides: the branches are terminated by slender loose spikes of small pale flowers, the calyxes of which afterwards become swelled and almost globular; are reflexed, and set with stinging hairs. It is a native of Mexico, flowering in July and August.

The sixth species is a fragrant shrub: the stem erect, branched, ash-coloured, the height of a man: the branches erect, round, like the stem: the branchlets rugged, pithy, bay-coloured: the shoots villose, rugged, from four-cornered round, green at top: the leaves opposite, seldom three together, spreading, sharp at both ends, crenate or bluntly serrate, except at the base, where they are entire, attenuated into the petiole, marked with lines above, and with erect, alternate, prominent nerves beneath, very much veined, wrinkled, villose, rugged, reclining, permanent, fragrant: petioles shorter than the leaf, round on one side, grooved or flat on the other, villose, edged with the decurrent leaf: heads terminating, axillary, peduncled, roundish, bracted, imbricate: the peduncles erect, single or two from each axil, scarcely longer than half the leaf, villose, rugged: the flowers sessile, one to each bracte, very close, compressed, white. It is a native of South America.

The seventh has four-cornered stalks which rise to the height of five or six feet, sending out side branches by pairs: the leaves three inches long, and about three quarters of an inch broad, of a pale green colour, and serrate: the spikes terminating, clustered, the longest about two inches, the others about half as long: the flowers blue, appearing late in summer. It is a native of Buenos Ayres.

The eighth species sends up many four-cornered furrowed stalks from the root, which rise five or six feet high: the leaves opposite, oblong, about three inches long, and an inch broad near the base, ending in acute points, deeply serrate on slender petioles: from the same joints come out short branches, set with smaller leaves of the same form: the stalks are terminated by spikes of blue flowers in clusters, which appear in August. It is a native of Canada.

The ninth is a very sweet-smelling under-shrub: the stem upright, branched, round, ash-coloured, a fathom in height: the branches three or four in a whorl, spreading very much, rugged: the branchlets six-cornered, bay-coloured: the leaves generally three together, sometimes four, spreading, of a bright green colour, and very pleasant smell like that of the lemon: the flowers in an erect terminating panicle, composed of spikes.

Culture.—These plants are not raised without

difficulty and attention. They may be increased by seeds, which should be sown in pots, or on a hot-bed, in the early spring, plunging the pots in the bed. When they are in a state of growth to remove, they should be planted in separate pots and replunged in a fresh hot-bed, shade being given till they have taken new root, when they must have the management of tender plants of the exotic kind. The annual sorts should be kept in the stove, or a glass case, where there is a bark-bed to plunge them in when too large to be continued under the frames; and the perennial sorts may be placed simply in such cases, air being admitted in a cautious manner.

Of these kinds, such as do not afford good seeds in this climate, may be increased by planting cuttings in the summer months in pots of good mould, placing them in the bark-bed of the stove, where they may be preserved many years.

The eighth sort may be raised from seeds by sowing them in the autumn, and by parting the roots and planting them out at the same time. They succeed best on a soft loamy soil, and are so hardy as to thrive in the open air.

The ninth sort may be readily increased by planting cuttings in the spring or autumn in pots of good mould. It should have the protection of the green-house or a glass case.

They afford variety among other potted plants in the green-house and stove, and some of the hardy sorts occasionally in the open ground.

VERBESINA, a genus affording plants of the herbaceous and woody flowering exotic kinds.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Oppositifoliæ*.

The characters of which are: that the calyx is common concave: leaflets oblong, channelled-concave, erect, commonly equal, in a double row: the corolla compound radiate: corollets hermaphrodite, many, in the disk: females about five in the ray: proper of the hermaphrodite funnel-form, five-toothed, erect:—female ligulate, trifid and wide or simple and very narrow: the stamina in the hermaphrodites: filaments five, capillary, very short: anthers cylindrical, tubular:—the pistillum of the hermaphrodite: germ somewhat oblong: style filiform, length of the stamens: stigmas two, reflexed:—in the females, germ somewhat oblong: style filiform, length of the hermaphrodite: stigmas two, reflexed: there is no pericarpium: calyx unchanged: the seeds in the hermaphrodites solitary, thickish, angular: pappus of two awl-shaped unequal awns: in the females very like the others: the receptacle chaffy.

The species cultivated are: 1. *V. alata*, Wing-stalked Verbesina; 2. *V. Chinensis*, Chinese Verbesina; 3. *V. nodiflora*, Sessile-flowered Verbesina; 4. *V. fruticosa*, Shrubby Verbesina; 5. *V. gigantea*, Tree Verbesina.

The first is an herbaceous plant, with an upright stem about two feet high, subdivided, round, winged, rough-haired: the branches alternate, erect, axillary: the leaves oblong, acuminate, angular-toothed, nerved, somewhat rugged, rough-haired: the stem has four wings formed by the leaves running down it: the peduncles elongated, terminating, pubescent, with flowers in single heads, of a deep orange-colour. It is perennial, and a native of South America, flowering most part of the summer.

The second species is a shrub with a single, round, subtomentose stem and undivided branches from the upper axils of the leaves; which are somewhat tomentose, bluntish, petioled: the flowers terminating, solitary, peduncled, and yellow.

The third has an annual root: the stem herbaceous, branched, a foot high, round, even: the leaves sessile, mostly terminating, cuneate-ovate, acuminate, nerved, hispid: the flowers sessile in the axils of the terminating leaves, two or three together, yellow, appearing in July. It is a native of the West Indies.

The fourth species rises with a shrubby stalk seven or eight feet high: the leaves deeply serrate and cut somewhat like those of the evergreen oak: the flowers are yellow, produced from the side of the stalks, and appear in July. It is a native of the West Indies.

The fifth has the stem fifteen feet high, and the thickness of a thumb at the lower part, smooth, green, and viscid; it is filled without interruption by a white inodorous pith, as in a rush; is simple, or at least but very slightly divided at top: and the whole stem is aphyllous, the leaves occupying only the upper part and branchlets: they are alternate, foot-stalked, and the largest are about a foot and a half long; they are villose and pinnatifid, with distant oblong lobes: from the bosoms of the upper leaves spring round whitish-villose peduncles, bearing at their tips the flowers, which are slightly foot-stalked, and closely heaped together, forming a kind of panicle: the corollets are white, and the anthers black. It is a native of the West Indies.

Culture.—These plants may be increased by sowing the seeds upon a moderate hot-bed, or in pots plunged into it, in the early spring months, and when the plants are of sufficient growth they should be removed into separate pots, or into a new hot-bed, giving shade till they become new-rooted; afterwards managing them as tender annual plants, being careful not to draw them up weak: about the middle of sum-

mer they may be taken up with balls to their roots, and be planted in a warm sheltered border, being protected and watered till re-rooted, little care being afterwards necessary: these produce seeds often in the autumn; but in the stove they may frequently be preserved over the winter.

They produce variety in stove- and green-house collections, and sometimes in the borders during the summer season.

VERONICA, a genus comprising plants of the herbaceous perennial and shrubby kinds.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a four-parted perianth, permanent: segments lanceolate, acute: the corolla one-petalled, wheel-shaped: tube length almost of the calyx: border four-parted, flat, with ovate segments; the lowest narrower, the segment opposite to this wider: the stamina have two filaments, narrower at bottom, ascending: anthers oblong: the pistillum is a compressed germ: style filiform, length of the stamens, declined: stigma simple: the pericarpium is an obcordate capsule, compressed at the top, two-celled, four-valved: the seeds numerous, roundish.

The species cultivated are: 1. *V. Sibirica*, Siberian Speedwell; 2. *V. Virginica*, Virginian Speedwell; 3. *V. spuria*, Bastard Speedwell; 4. *V. maritima*, Sea Speedwell; 5. *V. longifolia*, Long-leaved Speedwell; 6. *V. hybrida*, Welsh Speedwell; 7 *V. incisa*, Cut-leaved Speedwell; 8. *V. decussata*, Cross-leaved Speedwell.

The first has a perennial root: the stem four feet high, rough-haired: the leaves six or seven in whorls, twice as wide as those of the second sort: peduncles terminating solitary; the lateral ones with two opposite oval leaflets: the calyxes five-cleft: the corollets blue, with an oblong tube, and small acute border: the stamens and pistil twice as long as the corolla. It is a native of Siberia, flowering in July and August.

The second species has the stems erect, four or five feet high, having four or five lanceolate leaves in whorls at each joint, serrate, and ending in acute points: the stems are terminated by long slender spikes of white flowers, which appear late in July. It is a native of Virginia and Japan.

It varies with blush-coloured flowers.

The third has a perennial root, sending out many offsets: the lower leaves two inches long, and half an inch broad, pale green and hairy: the stems a foot high, with very narrow lanceolate leaves, placed opposite, and having a few slight serratures on their edges: the stems terminated by long spikes of blue flowers, which appear in June and July. It is a native of Siberia and Germany.

There is a variety of this also with a flesh-coloured flower.

The fourth species has the stalks not so long as those of the preceding: the leaves by fours and threes round the stalk, on longer footstalks; they are broader at the base, run out into long acute points, are unequally serrate, and of a bright green colour: the flowers are of a bright blue, and appear in July. It is a native of the sea-coasts of Europe.

There are varieties with leaves opposite, in threes or in fours, with blue, blueish, flesh-coloured, and with white flowers.

The fifth has the lower leaves two inches long, and an inch broad in the middle, drawing to a point at each end, serrate, and of a lucid green colour: the stems a foot and a half high, with leaves of the same shape but smaller, and placed opposite; they are terminated by long spikes of blue flowers, which appear in June. It is a native of Germany, Austria, and Russia.

The sixth species has the stems very white and woolly, about a foot high: the leaves oblong, hoary, two inches and a half long, three quarters of an inch broad, sessile: the flowers deep blue in terminating spikes, and from the upper axils: they appear in June and July. It is a native of Russia, Ukrain Tartary, &c.

There is a variety with white flowers.

The seventh has the spikes aggregate, the flowers large, the leaves an inch long, lanceolate wedge-shaped at the base, with lanceolate segments. It is a native of Siberia, flowering in July and August.

The eighth species is a bushy shrub about two feet high: stem upright, round, very much branched: the branchlets alternate, spreading, round or indistinctly quadrangular, closely leafed on every side, having a pubescent line on each side running down from the oppositions of the leaves, which spread very much, are scarce an inch long, acute, coriaceous, smooth and even, one-nerved, paler underneath, evergreen, border cartilaginous, on very short concave smooth petioles, gibbous at the base on the outside: the racemes single, short, few-flowered, towards the end of the branches, not terminating, but just below the top: the pedicels alternate, short, quadrangular, one-flowered. The regular growth of the leaves, decussated or crosswise, distinguishes this species immediately.

Culture.—These plants may be raised by seed and parting the roots.

In the annual sorts the seeds should be sown in the autumn or very early spring, in the borders or places where the plants are to grow, be-

ing lightly covered in: if the seeds be permitted to scatter, good plants may be raised: sometimes they are sown on beds to be afterwards removed.

In the perennial sorts the roots may be parted in the autumn or early spring, and planted out where they are to grow, or in nursery-rows to be afterwards removed.

They should not be parted too small, or oftener than every two years: the large-growing sorts are proper for the borders, clumps, &c. and the trailing kinds for banks and shady slopes, or other similar places: they are hardy, and require only to be kept clean afterwards.

The eighth sort is readily increased by cuttings in the spring and summer, being managed as a hardy greenhouse plant in the same way as the Myrtle.

In very mild winters it sometimes stands secure in the open air.

The annual and perennial sorts afford variety in the borders, clumps, and other parts of pleasure-grounds, and the last among plants of the hardy potted green-house kinds.

VERMIN, a term applied to various small animals that are injurious to garden crops.

Rats and Mice are of this kind, and do much mischief in sheds and other places, where they frequently destroy beans, pease, and other seeds: they should therefore be extirpated as much as possible.

And there are different modes of destroying them; as by traps, poison, &c. But Mr. Forsyth advises never to use arsenic, or corrosive sublimate, for that purpose, except under particular circumstances, as they are deadly poison: nux vomica will, he thinks, generally answer the end as well, without the danger. He has suggested it as a very good plan to prevent accidents, to "enclose the traps in cases, having holes in the ends of them large enough to admit rats, but small enough to exclude dogs, cats, &c."

The following is recommended as a bait for rat-traps. "Take a pound of good flour, three ounces of treacle, and six drops of the oil of caraways: put them all in a dish, and rub them well together till they are properly mixed; then add a pound of crumb of bread. The traps baited with this mixture should be set as near their haunts as possible; but, for two or three days, so as not to fall or strike on the rats going in, but letting them have free liberty to go in and out at pleasure, as this makes them fearless. Some of the bait should also be laid at the rat-holes, and a little of it scattered quite up to the traps, and so on to the bridge of each trap, where a handful may be placed." It may also, he says, "be proper to scent the traps with the following mixture, for the purpose of enticing the rats into them.

"Take twenty drops of oil of rhodium, six or seven grains of musk, and half an ounce of oil of aniseed; put them in a small phial, and shake it well before using; then dip a bit of twisted paper, or rag, in the mixture, and rub each end of the trap with it, if a box-trap, and put two or three drops on the bridge, leaving the paper or rag in the trap. Of whatever kind the trap is, it should, he says, be scented; but once in a twelvemonth will be sufficient. Then throw some chaff mixed with a little wheat about the bottom of the trap, in order to deceive the rats; for they are very sagacious, and will not enter a suspicious place. This will be necessary to be done only at the first time of setting the traps, for after some rats have been caught and have watered and dunged in them, rats will enter boldly when they find others have been there before them: do not, therefore, wash or clean out the trap, as some people do before they set it again, but let the dung and urine remain in it. Keep the places where the traps are set as private as possible; and when they are set for catching, mix no bread with the bait, as the rats will in that case be apt to carry it away."

It is advised, "when the holes are found quiet, and that no rats use them, to stop them up with the following composition. Take a pint of common tar, half an ounce of pearl-ashes, an ounce of oil of vitriol, and a good handful of common salt, mix them all well together, in an old pan or pot. Take some pieces of paper, and lay some of the above mixture very thick on them; then stop the holes well up with them, and build up the mouth of the holes with brick or stone, and mortar; if this be properly done, rats will, he asserts, no more approach these, while either smell or taste remains in the composition."

In order to destroy the rats in places where traps cannot be set, he recommends us to "take a quart of the above bait, then rasp into it three nuts of nux vomica, and add a quarter of a pound of crumb of bread, if there was none before; mix them all well together, and lay it into the mouth of their holes, and in different places where they frequent; but first give them of the bait without the nux vomica, for three or four succeeding nights; and when they find it agrees with them, they will eat that mixed with the nut with greediness."

It is observed that "rats are frequently very troublesome in sewers and drains. In such cases arsenic may be used with success, as follows: Take some dead rats, and having put some white arsenic, finely powdered, into an old pep-

per-box, shake a quantity of it on the foreparts of the dead rats, and put them down the holes, or avenues, by the sides of the sewers at which they come in; this puts a stop to the live ones coming any further; for when they perceive the arsenic, they will, he says, retire immediately; whereas if they were put down without the arsenic the live ones would eat them."

We have, however, found that these animals take arsenic best when it is prepared by being finely levigated and mixed up with very strong old cheese and oatmeal. In order to destroy mice, Mr. Forsyth advises to "take a quart of the bait for rats before there is any bread mixed with it; then take four nuts of nux vomica, and rasp them very fine, otherwise the mice will pick out the food from it, on account of its bitter taste; rub them well together; lay some of it on a piece of paper, or, if without doors, on a piece of tile, removing all other food from the place, and it will kill all that eat of it. What is not eaten should be taken away in the morning, and replaced at night. If this be in a garden, shelter it with boards or tiles, that it may not get wet.

"Open traps should likewise be set, as mice are shy in entering close ones. And care should be taken not to convey these animals into gardens by the straw litter, or other similar materials."

Slugs are a sort of animals that are frequently found harbouring about the foundations of walls, and about the roots of pease, lettuce, &c. "They may," Mr. Forsyth says, "be picked off, and killed, by putting them into a pot in which is a little fine unslaked lime; or the ground where they are should be well watered with soap-suds and urine, mixed with tobacco-water. When they are numerous on the surface of the ground, which frequently happens after rain, or in a dewy morning, fine unslaked lime thrown over the borders, &c., will, he says, destroy them. But he prefers the above mixture, which, if the ground be well watered with it, will bring them up out of their holes, when they very soon die; it will also destroy their eggs, which they always deposit in the earth."

"Snails also, during the winter," he says, "gather themselves together in clusters; and in that season are frequently found in great numbers behind wall-trees, and in holes of the walls. They should be carefully picked off and crushed, which is the only effectual way of getting rid of them. If any should escape, they should be destroyed as they make their appearance in the spring. As they also deposit their eggs in the ground, the borders should be well watered in the above manner."

Wasps and flies are highly destructive of all sorts of fruit: therefore, as soon as the wasp and large flesh-fly make their appearance, "get ready several bottles or phials; then mix up grounds of wine or beer, with sweepings of sugar, honey, or grounds of treacle, and with this mixture fill the bottles half or three-quarters full, then place some of them at the bottom of the wall, and hang a sufficient number up by a piece of yellow willow, or packthread, on the nails against the walls in different places, observing to empty them frequently, as they fill with flies and wasps; first pour the liquor into an empty bottle, and then shake out the dead insects, crushing them with your foot, that none of them may revive; then pour back the liquor into the bottles and phials as at first. In this manner a great many may be destroyed, he says, before the fruit becomes ripe. If you begin to hang up the bottles as soon as you see the fly, which comes much earlier than the wasp, you will be able to destroy great numbers of them, and will have the bottles ready for the wasps when they make their appearance. The fly will be found as destructive as the wasp to grapes." And "when the weather is hot, and the wasps are numerous, if they do not enter the bottles fast enough, (which will happen when the fruit is very ripe), a little oil may, he says, be put in a cup, and with a feather dipped in it touch their backs and they will instantly drop down; when you will find them turned black and green by the effects of the oil."

Birds attack fruit much when it begins to ripen. The best preventive in this case is, Mr. Forsyth says, "to cover the trees with nets, or bunting, a sort of cloth of which ships' colours are made." See VITIS.

There are many other animals of the insect tribe that are likewise highly destructive to fruits and garden crops, but which are noticed under the articles which they are found to injure.

VERVAIN. See VERBENA.

VERVAIN MALLOW. See MALVA and URENA.

VIBURNUM, a genus containing plants of the deciduous and evergreen flowering kind.

It belongs to the class and order *Pentandria Trigynia*, and ranks in the natural order of *Dumosæ*.

The characters are: that the calyx is a five-parted perianth, superior, very small, permanent: the corolla one-petalled, bell-shaped, five-cleft: segments blunt, reflexed: the stamina have five awl-shaped filaments, length of the corolla: anthers roundish: the pistillum is an inferior germ, roundish: style none, but in its stead a turbinate gland: stigmas three: the pericarpium is a roundish berry, one-celled: the seeds bony, roundish.

The species cultivated are: 1. *V. Lantana*, Wayfaring Tree; 2. *V. Opulus*, Water Elder; 3. *V. Lentago*, Pear-leaved Viburnum; 4. *V. Cassinoides*, Thick-leaved Viburnum; 5. *V. nitidum*, Shining-leaved Viburnum; 6. *V. lævigatum*, Cassioberry Bush; 7. *V. nudum*, Oval-leaved Viburnum; 8. *V. prunifolium*, Plum-leaved Viburnum; 9. *V. dentatum*, Tooth-leaved Viburnum; 10. *V. Tinus*, Laurustinus or Laurustine.

The first is a thickly-branched shrub or small tree, having round, pliant, mealy twigs, with the same kind of tufted stellated pubescence as is found on the flower-stalks, backs, and even upper surfaces of the leaves: the leaves opposite, somewhat elliptical, cordate, obtuse, serrate, strongly veined, turning dark red before they fall in autumn: stipules none: the flowers whitish, in large terminating, solitary, many-flowered cymes. It is a native of most parts of Europe, flowering here in May. It is sometimes known by the name of Pliant Mealy Tree; and according to Withering the bark of the root is used to make birdlime.

There is a variety in North America with larger leaves, of a bright green; and with variegated leaves in nurseries.

The second species is a small bushy tree, smooth in all its parts, and very much branched: branches opposite, round: the leaves subcordate, with three great unequally serrate lobes, veined, paler beneath; their petioles bearing several cup-like glands towards the top, and a pair or two of erect linear appendages, scarcely to be called stipules, near the base: the cymes terminating, solitary, composed of many white flowers, radiant; the inner perfect, small, resembling those of Elder; those in the margin abortive, consisting merely of a large irregular flat petal without any organs of fructification: the stigmas nearly sessile, close together: the berries drooping, globular, crowned with five very small scales of the calyx, red, very succulent. It is a native of Europe, flowering early in June; the bright-red berries ripen about September, and towards the middle of October the leaves assume a beautiful pink colour.

There is an American variety, which is a shrub, that has the twigs of a shining red colour, and which rises eight or ten feet high, with many side branches, covered with a smooth purple bark: the leaves cordate-ovate, ending in acute points, deeply serrate, having many strong veins, and standing upon very long slender footstalks.

There is another beautiful variety common in plantations under the name of Guelder Rose, bearing large round bunches of abortive flowers only, which rises to the height of eighteen or twenty feet if permitted to stand: the stem becomes large; the branches grow irregular, and are covered with a gray bark: the leaves are divided into three or four lobes, somewhat like those of the Maple; they are about three inches long, and two and a half broad, jagged on their edges, and of a light green colour: the flowers come out in a large corymb, are very white, and, being all neuters, are barren; from their extreme whiteness, and swelling out into a globular form, some country people have given this shrub the name of *Snow-ball* Tree. It is also sometimes called *Elder Rose* and *Rose Elder*.

The third has the branches bent or hanging down: the petioles waving on the edge: the leaves thick, like those of the tenth sort, smooth, serrulate with very small teeth: the germ terminating, awl-shaped, ventricose at the base. It is a native of North America, flowering here in July.

The fourth species has the lowest leaves ob ovate; the next ovate; the upper ones lanceolate. It is a native of North America. It flowers in June.

The fifth is a native of North America. It flowers in May and June.

The sixth species has the leaves petioled, broad-lanceolate, sharpish, without any raised veins: the petioles decurrent along the back, whence the twigs are ancipital: the corymb short: the stem twelve or fourteen feet high, sending out branches from the bottom to the top: the leaves about an inch long, and more than half an inch broad, of a light green colour, opposite, on short footstalks: the peduncles axillary, very short, supporting small umbels of white flowers, which appear in July. It is a native of South Carolina.

The seventh has a strong stem, covered with a brown smooth bark, and rising to the height of ten or twelve feet, sending out woody branches on every side the whole length, which have a smooth purplish bark: the leaves opposite, five inches long and two and a half broad, smooth and of a lucid green above, veined and of a light green beneath, entire at the edges, (indistinctly notched,) and rounded at both ends; of the same thickness with those of the Broad-leaved Laurustinus: the flowers are produced in large umbels (cymes) at the end of the branches, are in shape and colour like those of the common Laurustinus, but smaller; and the stamens are much larger than the corolla: they appear in July, and are succeeded by roundish berries, which, when ripe, are black. It is a native of America, flowering in May and June.

There are varieties with deciduous and evergreen leaves.

The eighth species rises with a woody stalk ten or twelve feet high, covered with a brown bark, and branching its whole length: the branches, when young, are covered with a smooth purple bark: the leaves two inches long, and an inch and quarter broad, slightly serrate, and on short slender footstalks, opposite or without order: the flowers in small umbels (cymes) lateral and terminating; these are white, and smaller than in the first sort, appearing in June, and are sometimes succeeded by berries. It grows naturally in most parts of North America, where it is commonly called *Black Haw*.

The ninth has the stalks soft and pithy, branching out greatly from the bottom upward, and covered with a gray bark: the leaves three inches long, and nearly as broad, strongly veined, of a light green colour, placed opposite upon pretty long footstalks: the flowers in terminating corymbs, white, and almost as long as those of the first sort, appearing in June. It is a native of North America.

There are varieties with the leaves smooth on both sides, and with the leaves downy underneath and drawn out to a point.

In the tenth species the leaves are seldom more than two inches and a half long, and an inch and quarter broad; they are rounded at their base, but end in acute points, are veined and hairy on their under side, and not of so lucid a green colour as the following sort on their upper.

There are several varieties; as the smaller hairy leaved, in which the umbels (cymes) of flowers are smaller, and appear in autumn, continuing all the winter. The plants are much hardier.

The shining-leaved, in which the stalks rise higher, and the branches are much stronger: the bark is smoother, and turns of a purplish colour: the leaves are larger, of a thicker consistence, and of a lucid green colour: the umbels (cymes) are much larger, and so are the flowers; these seldom appear till the spring, and when the winters are sharp, the flowers are killed, and never open unless they are sheltered.

There is a sub-variety of this with variegated leaves; with gold-and silver-striped; in which the branches are warted, the younger ones four-cornered: the leaves opposite, ovate, on short petioles, rigid, shining, perennial; the younger ones hirsute, with short ferruginous villose hairs: flowers in crowded cymes, with little bractes between them: the corolla white; and the berries, when ripe, blue.

The common, with narrower leaves, hairy only on the edge and veins underneath: the fruit smaller.

And the Upright Laurustinus.

Culture.—These plants may some of them be increased by seeds, most of them by layers, many by cuttings, and a few by suckers.

The seeds in the deciduous kinds should be sown in the autumn or spring in beds of light fine mould, being well covered in. The plants appear in the first or second year, and when they are of a twelvemonth's growth they should be planted out in nursery-rows, to be continued till of proper growth to plant out in the shrubberies or other parts of pleasure-grounds, as from two to five feet.

In the Laurustinus kinds, the seeds after being mixed with mould in the autumn soon after they become ripe, and exposed to the air and rain in the winter, should in the spring be sown on a gentle hot-bed, or in pots plunged into it; the plants being continued in the bed till the autumn, when they should be removed and managed as in the layer method. The plants raised in this way are said to be hardier than those raised from layers.

The first sort is tedious in being raised from seeds.

In the layer, which is the most expeditious mode of raising most of these plants, the young lower branches should be laid down in the autumn or spring, being pegged down in the usual manner in the earth, when they mostly become well rooted in a twelvemonth, and may then be taken off and planted out where they are to remain, or in the nursery; and sometimes, in some of the kinds, a few are put in pots.

The best season for removing the tenth sort is in the early autumn, that they may be well rooted before the winter.

The first sort succeeds best by layers put down in the autumn. And the striped variety may be increased by budding it upon the plain sort.

The cuttings may be made in the autumn from the strong young shoots, being planted in a moist border in rows, when in the following summer many of them will be well rooted, and form little plants. Most of the deciduous sorts may be raised in this way.

The suckers should be taken up in the autumn or spring with root-fibres, and be planted out in nursery-rows to have a proper growth. The Guelder Rose may be readily increased in this way, and sometimes the Laurustinus.

The fourth sort is rather tender in winter while in its young growth, as well as the sixth, and should have protection in that season. A plant or two should be constantly laid in pots under shelter. This last is easily increased by layers.

These plants afford much variety and effect in shrubbery and other parts of pleasure-ground, when planted out in a mixed order. The ever-

green sort are often used to cover disagreeable objects. The flowering evergreens are likewise often set out in pots.

VICIA, a genus furnishing plants of the biennial, perennial, and annual hardy kinds.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leafed perianth, tubular, erect, half-five-cleft, acute: upper teeth shorter, converging, all of equal breadth: the corolla papilionaceous: banner oval, with a broad oblong claw, at the tip emarginate with a point, bent back at the sides, with a longitudinal compressed raised line: wings two, oblong, erect, half-cordate, with an oblong claw, shorter than the banner: keel with an oblong two-parted claw, the belly compressed, semiorbicular, shorter than the wings: the stamina have diadelphous filaments, single and nine-cleft: anthers erect, roundish, four-grooved: a nectareous gland springs from the receptacle between the compound stamen and the germ, short, acuminate: the pistillum is a linear germ, compressed, long: style filiform, shorter, ascending at an erect angle: stigma obtuse, transversely bearded below the tip: the pericarpium is a long legume, coriaceous, one-celled, two-valved, terminated by a point: the seeds several, roundish.

The species cultivated is *V. Faba*, The Bean.

It has an annual root: the stem upright, about two feet high to three or four in the larger garden varieties, thick, angular: the leaves without tendrils: the leaflets about three pairs, ovate-oblong, tomentose, convoluted: the flowers several together in the axils, white with a black silken spot in the middle of the wings: the legumes thick, roundish, straight, pointed, very woolly within, containing several large ovate flatted seeds. It is a native of Egypt.

There are several varieties of garden beans; as the Mazagan Bean, which is the first and best sort of early beans at present known. It is brought from a settlement of the Portuguese on the coast of Africa, just without the Straits of Gibraltar, and smaller than those of the Horse Bean.

The early Portugal or Lisbon Bean, which is the next, and appears to be the Mazagan sort saved in Portugal, as it is very like those which are the first year saved in this country. It is the most common sort used by the gardeners for their first crop, but they are not near so well tasted as the Mazagan.

The small Spanish Bean, which comes in soon after the Portugal sort, and is rather a sweeter bean.

The Broad Spanish, which is a little later than the other, but comes in before the common sorts, and is a good bearer.

The Sandwich Bean, which comes soon after the Spanish, and is almost as large as the Windsor Bean; but, being hardier, is commonly sown a month sooner. It is a plentiful bearer, but not very delicate for the table.

The Toker Bean, which comes about the same time with the Sandwich, and is a great bearer.

The White and Black Blossom Beans, which are also by some much esteemed; the beans of the former, when boiled, are almost as green as peas; and being a tolerable sweet bean renders it more valuable. These sorts are very apt to degenerate, if their seeds are not saved with great care.

The Windsor Bean is allowed to be the best of all the sorts for the table: when these are planted on a good soil, and are allowed sufficient room, their seeds will be very large, and in great plenty; and, when they are gathered young, are the sweetest and best-tasted of all the sorts; but these should be carefully saved, by pulling out such of the plants as are not perfectly right, and afterward by sorting out all the good from the bad beans.

This sort of bean is seldom planted before Christmas, because it will not bear the frost so well as many of the other sorts; so it is generally planted for the main crop, to come in June and July.

And of the small early varieties, there is one which is chiefly planted for curiosity. It is a dwarf, six or ten inches in height, with branches spreading like a fan, and flowers succeeded by small pods, both in clusters; whence it is called Dwarf Fan or Cluster Bean.

Also of the middle-sized later beans, a sort now very commonly cultivated is the Long-podded Bean, a yard or more in height, a great bearer, the pods long and narrow, closely filled with oblong middle-sized seeds. Of this there are several sub-varieties, as the early, the tall, the Turkey, &c.

The White-blossomed Bean, which has none of the black mark on the wings. The seed is semitransparent, and having less of the peculiar bean flavour, when young, than any of the others, is by many in much esteem. It bears abundance of smallish, long, narrow pods, and the seeds are almost black when ripe.

And there is a red-blossomed bean, with smallish pods and seeds, but which is not near so palatable as that with white blossoms.

There are also other varieties.

Culture.—These crops are raised with much facility by sowing them at different times from

October to March, or later. The small sorts are mostly used for the earliest crops, and the first two or three of the above sorts are the most proper for the purpose; but the Mazagan kind is the earliest of all, and most proper to plant for the first crop, and the Portugal and Small Spanish Bean next, all of which should be planted early on warm south borders, or other sheltered sunny exposures, under or near walls, pales, or hedges, or other warm defended quarters, every month from October till the beginning of February; in order that if the first planting should fail by inclement weather in winter, the others may succeed; and if all the crops should survive the frost, they will succeed one another regularly in bearing. The planting should be performed in rows, ranging south and north, two feet and a half asunder, an inch and half deep, and two or three inches apart in each row. They may also be planted in one row length-ways close along under a south wall, &c.

The Dwarf Bean is not proper to be planted for any general crop, only a few for variety; and for which purpose it may be put in in autumn or winter, or in any of the spring or summer months till June or July, in rows two feet asunder, or in patches about the borders.

Of the middle-sized sorts, the Long-pods, Broad-Spanish, and White-blossomed Bean are the best for general culture; though some of all the others may be planted occasionally; and the season for these sorts being put in, is for the first crop in November or December, on a broad warm border, or in any of the most sheltered kitchen-garden quarters, in rows two feet and half or a yard asunder, three inches distance in the row, and two or three inches deep; repeating the planting every month till March, in the open quarters.

Of the large kind, the Sandwich and Toker kinds, being generally more plentiful bearers, and of somewhat less succulent growth than the Windsor, are rather hardier to resist the frost, and may be planted earlier, as before Christmas, for the first crop; and any time after, till May, if required; and of the Windsor, a small or moderate crop may be planted in December, in open mild weather, and a dry soil; in a larger supply in January; and a first full crop in February; and thence in full supplies, of these or any of the other larger sort, every three or four weeks, till the end of April, for the main crops; continuing planting them till the end of May, to have successions as long in the season as possible. These should constantly be planted in open exposures, in rows a yard asunder, or three feet and a half for the large Windsor sort; four or five inches asunder in each row, and three deep.

They succeed in any common soil, but where the land is manured for them it is the best.

The general method of planting them is by the dibble, or in drills; for early planting in dry ground, a shallow drill may be first made, then planting the beans in a row along the bottom, allowing from two to four or five inches distance in the row, according to the size or growth of the different varieties, and from one and a half to three inches deep in the small and large beans; and when the plants are come up about three inches high, they should be landed or earthed up on each side of the row with a drawing hoe, keeping them clear from weeds by occasional hoeing in dry weather; and after having advanced nearly to full growth and in bloom, it is proper to top the plants in general, which throws all the nourishment to the embryo pods, and greatly promotes their setting, and forwards their growth; and in the latter crops prevents their being so much annoyed with the small black fly.

In gathering the crops, avoid pulling up the stems, especially when the land is moist.

VINCA, a genus comprehending plants of the shrubby, evergreen, upright, and trailing kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Contortæ*.

The characters are: that the calyx is a five-parted perianth, erect, acute, permanent: the corolla one-petalled, salver-shaped: tube longer than the calyx, cylindric below, wider above, marked with five lines, the mouth a pentagon: border horizontal, five-parted: segments fastened to the apex of the tube, wider outwards and obliquely truncate: the stamina have five filaments, very short, inflexed and retroflexed: anthers membranaceous, obtuse, erect, curved in, fariniferous on both sides at the edge: the pistillum has two roundish germs, with two roundish little bodies lying by their sides: style one common to both, cylindric, length of the stamens: stigma capitate, concave, placed on a flat ring: the pericarpium has two follicles, round, long, acuminate, erect, one-valved, opening longitudinally: the seeds numerous, oblong, cylindric, grooved, naked.

The species cultivated are: 1. *V. minor*, Small Periwinkle; 2. *V. major*, Great Periwinkle; 3. *V. rosea*, Madagascar Periwinkle.

The first has a perennial creeping root, with branched fibres: the whole plant smooth and shining: the stems round, slender, leafy, erect when in flower, from nine inches to a foot in height, and much higher when supported by bushes, marked on each side with a groove faintly impressed; after flowering, prostrate, elongated, taking root at their joints. Accord-

ing to Woodward, the flowering-stem is upright in the spring, but in autumn the flowers are borne on the shoots of the year, which are trailing: the leaves opposite, on footstalks about one fourth the length of the leaves, which are quite entire, evergreen, shining, somewhat like those of Privet, not having the fringed edge observable in the second sort: the flowers axillary, alternate, solitary, void of scent, on nearly upright peduncles, almost twice the length of the leaves, round, smooth, and shining, pale blue. It is a native of Germany.

It varies in the colour of the flowers; with pale blue, with purple, and white, and with double flowers; and the foliage is sometimes variegated either with white or yellow stripes.

The second species is larger in all its parts than the preceding: the stems erect, finally rooting at the end: the leaves broad-ovate, three inches long and two broad, of a thick consistence, finely fringed with short rigid hairs at the edge, on thick footstalks: the flowers solitary, alternate, on peduncles half the length of the leaves, of a purple blueish colour. It is a native of France, Spain, &c. flowering in May.

The third has an upright branching stem, three or four feet high, when young, succulent, jointed, purple; but as the plant advances the lower parts become woody: the branches have the joints very close, are covered with a smooth purple bark, and have oblong, ovate, entire leaves, two inches and a half long and an inch and half broad, smooth and succulent, setting pretty close to the branches: the flowers axillary, solitary, on very short peduncles: tube long and slender: brim spreading open, flat, divided into five broad obtuse segments, which are reflexed at their points: the upper surface of the petal is of a bright crimson or peach colour, and their under side pale flesh-colour: there is a succession of flowers, from February to the end of October. It is a native of Madagascar, China, &c.

Culture.—These plants are all capable of being increased by layers, cuttings, and suckers.

In the first method, when the layers of the trailing branches are put down into the ground, they readily take root at almost any season. This is very much the case with the first sort, as almost every joint furnishes plants in the course of the summer ready to be put out in the autumn.

The cuttings may be made from the stalks and branches, and be planted in shady borders in the autumn or early spring, where they will become well rooted by the following autumn.

All the sorts succeed in this way.

In the third sort the cuttings should be made from the young shoots and be planted in pots, plunging them in a hot-bed or the bark-bed, where they will become perfectly well rooted in the same year, and may be potted off separately, being placed in the stove, and shifted as may be necessary into large pots.

This sort may likewise be raised from seed, which should be sown in pots in the early spring filled with light rich earth, covering them well in, and plunging the pots in the hot-bed, or the bark-bed of the stove; and when the plants have a few inches growth, they should be pricked out into separate pots, replunging them in a hot-bed, giving proper shade and water, managing them afterwards as the cuttings.

The suckers may be taken off with root-fibres in the autumn or spring, and planted where they are to grow.

The two first sorts afford variety in the borders, clumps, &c. while the last has a fine effect in stove collections.

VINE. See VITIS.

VINERY, a sort of garden erection, consisting of a wall twelve or fourteen feet in height, extending from east to west, furnished with stoves, and proper flues, with roof and lights of glass, covering a border of some extent; as ten feet or more in width. When vines are to be forced at an early season, upright glasses two and half or three feet in height are often employed in front, to support the roof, and to admit sun and light to the border, which is frequently occupied with low-growing vegetables; but when they are not wanted early, a low wall will answer equally well. In plate D. is seen an improved vinery, or house of this kind; in which fig. 1. shows the elevation: fig. 2, section of the end: fig. 3. section showing the flues: fig. 4. the plan. It has been found to answer well in actual practice. In houses of this sort, supposing the wall to be twelve feet high, the breadth ten feet, and the height of the upright wall in front three feet, the roof will form an angle of about forty-three degrees, which experience has shown to be a suitable pitch for forcing vines with advantage.

These sorts of buildings may likewise be constructed on a plan somewhat similar to that of a single-pitted pine-stove, having the back wall fourteen feet high; the roof slanting, and covering an extent of about sixteen feet; with a flue running from east to west near the front wall. This is well suited not only for grapes, but early crops of melons, strawberries, and other similar kinds.

To save the expense of glass; where there are peach-houses, the glass frames may be also employed for the vinery, when constructed with this intention, and good grapes may be obtained from vines trained against walls about six feet

high, by means of melon-frame glasses, where a small slanting roof is made proper to receive them. But a small degree of fire-heat is of great advantage, and might be applied either by a flued wall, the flue running through the house, or by cast-iron pipes for the purpose.

"These houses," Mr. Nicol says, "vary exceedingly in construction; and although some lay great stress on this article, and there are extremes which ought not to be followed; he is convinced the failure of success, in the production of the grape, is much less a consequence of *bad* construction in the house, than in the preparation of the border, the choice of the kinds, and the general management. It has fallen to his lot to have the construction and management of three several and differently constructed grape houses, in the same garden, under his care, for years, which have equally and uniformly produced excellent crops. This, in his opinion, is a proof of the necessity of a greater niceness in the formation of the border being observed, than in the construction of the house; the fire-place and flues excepted, which should always be particularly attended to."

He also thinks that the site of a vinery is an object of such consequence to the welfare of the plant, and successful cultivation and production of well-flavoured fruit, that the greatest care should be taken in the choice of it. "A gentle hill, having a south aspect, and considerable declivity that way, the soil a strong brown loam of two feet, over a bottom of dry sand, gravel, or soft clay, is, he says, the most desirable, and would be the least expensive of all situations. In this case, the border requires no paving or draining; and admits of a proper mixture of sandy loam, vegetable mould, marle, and dung, by the removal of two feet of the natural bottom, with the natural soil, to form a border, perfectly adapted to the growth of the vine, in the following proportion, viz. One half strong brown loam, a quarter light sandy loam, an eighth vegetable mould of decayed tree leaves, and an eighth stable dung; to which add about a fiftieth part of shell marle. This is the composition, he says, of the vine borders at Wemyss Castle, none of which are less than four feet deep, and one (owing to the accidental situation of the house) is six." See FORCING of VINES.

In order to form borders against these hot-walls in other cases, they should have the earth taken out two feet deep where the ground is dry, but in other cases one foot will be sufficient, as in wet sills the borders should be raised at least two feet above the level of the ground, to prevent the roots of the vines from being injured by the wet. The bottom of this trench should be filled with stones, lime rubbish, &c., a foot and a half or two feet in thickness, which should be levelled and beaten down pretty hard, to prevent the roots from running downward. The trenches should be made five feet wide at least, otherwise the roots will in a few years extend themselves beyond the rubbish, and, finding an easy passage downwards, run into the moist ground, and be thereby much injured or destroyed; but before the rubbish is filled into the trench, it is a better method to raise a nine-inch wall, at that distance from the hot-wall, which will keep the rubbish from intermixing with the neighbouring earth, and also confine the roots to the border in which they are planted. This wall should be raised to the height of the intended border, and may be useful to lay the plate of timber of the frames upon, which will be necessary to cover the vines with when they are forced; and where the borders are raised to any considerable height above the level of the ground, these walls may preserve the earth of the borders from falling down into the walks; but in carrying them up it will be proper to leave little openings about eight or ten feet distant, to let the water pass off by. As soon as the walls are finished and thoroughly dry, the rubbish should be filled in, as directed above, when there should be fresh light earth laid upon it two feet thick, which will be a sufficient depth of mould for the vines to root in. The borders should be prepared in this manner at least a month or six weeks before the vines are planted, in order that they may have time to settle. See VITIS.

VIOLA, a genus containing plants of the herbaceous fibrous-rooted perennial kind.

It belongs to the class and order *Syngenesia Monogamia* (*Pentandria Monogynia*), and ranks in the natural order of *Campanaceæ*.

The characters are: that the calyx is a five-leaved perianth, short, permanent: leaflets ovate-oblong, erect, more acute at the tip, obtuse at the base, fastened above the base, equal, but variously disposed: of which two support the uppermost petal, two others each a second and third lateral petals, and the remaining one, the two lowest petals together: the corolla five-petalled, irregular: petals unequal: the uppermost petal straight, turned downwards, wider, blunter, emarginate, finishing at the base in a blunt horned nectary, prominent between the leaflets of the calyx: the two lateral ones paired, opposite, obtuse, straight: the two lowest paired, bigger, reflexed upwards: the stamina have five filaments, very small; two of them, which are nearest to the uppermost petal, enter the nectary by annexed appendages: anthers commonly connected, obtuse, increased by

Painted by Syd Edwards London Published Decr 1st 1805. by G Kearsley Fleet Street

Vinca Rosea
1 *Madagascar Periwinkle*

Viburnum Tinus
2 *Laurustinus*

membranes at the tip: the pistillum is a superior germ, roundish: style filiform, prominent beyond the anthers: stigma oblique: the pericarpium is an ovate capsule, three-cornered, obtuse, one-celled, three-valved: the seeds many, ovate, appendicled, fastened to the valves: the receptacle linear, running like a line along each valve.

The species cultivated are: 1. *V. odorata*, Sweet Violet; 2. *V. palmata*, Palmated Violet; 3. *V. pedata*, Multifid-leaved Violet; 4. *V. tricolor*, Pansy Violet or Heart's Ease.

The first has a fibrous whitish root; in old plants the upper part becomes knobby, and appears above ground, the knobs being formed from the base of the petioles which are left yearly; from the bosom of these knobs spring the scions or runners which creep on the ground, and are furnished with leaves and the same kind of stipules which are observable at the bottom of the plant; these runners are very long, and in general do not produce flowers till the second year: the leaves somewhat rounded at the tip, notched at the edge, on the upper side smooth and shining, underneath slightly hairy, when young rolled in at the edges on longish upright nearly smooth footstalks, which sometimes, however, have a few scattered hairs: the stipules from the stump of the root in pairs, lanceolate, toothed, pale: each tooth terminates in a minute gland: the flower-stalks springing from the root, taller than the leaves, smooth, bearing a pair of narrow bractes, pressed to the stalk, and placed above the middle of it: they are incurvated at top, and support one nodding flower of a dark purple colour. It is a native of every part of Europe, flowering in March and April. It is in general very highly esteemed for its fragrance.

There are different varieties: as the single blue and white, the double blue and white, and the pale purple; it is also found with white flowers; and it has been found wild with double flowers. This variety is in much esteem, both for the superior size of the flowers and their extreme fragrancy; and as they appear later they keep up the succession.

The second species has a perennial root: the leaves five-parted: the segments ovate: the middle segment wider: the outer one toothed only at the base. It is a native of Virginia, flowering here in May and June.

It is curious, and rare in this country, having no sweet scent to recommend it.

The third has the leaves divided into seven parts or lobes, which are sometimes toothed; they are of the sort called pedate: the flowers stand upon naked foot-stalks, are blue, and have no scent. It is a native of North America, flowering in June.

The fourth has the stem about four or six inches high, angular, pubescent, at bottom of a dull purple colour: branches alternate, erect: the leaves alternate, petioled, hairy especially about the edge, but sometimes smooth; the lowermost often smaller and roundish, the uppermost narrow and slightly indented: the peduncles alternate, nearly quadrangular, channelled on the back, bent in at top: the petals obcordate, shorter than the calyx, and whitish or yellow-white, in its wild state, but longer than the calyx, and variegated with yellow and purple in gardens. The truly wild plant has sometimes a few purple streaks, and in a somewhat improved state is blue or purplish, with or without yellow or white. It is a native of Europe and Japan, flowering from May to September.

It varies with more than two colours; as purple, blue, yellow, white, improved and enlarged by garden culture.

Culture.—The first sort may be increased by seeds or parting the roots: the seeds may be sown in a bed of light earth, soon after they become ripe, in the beginning of autumn; and when they have some growth be removed into a shady border, until the autumn, when they may be set out where they are to grow. The double-flowered sorts afford no seed. The best mode is, however, by parting the roots in the early autumn, or after they have flowered, and planting them out in the borders, or in beds at good distances, at the latter season watering them well. When intended for flowers they should not be parted oftener than once in three or four years.

The second and third sorts succeed best by being planted in pots filled with loam and bog earth well mixed, plunging them in the mould of a north border, where they should be protected in winter, or removed under a common hot-bed frame.

The fourth sort rises readily from scattered seeds, and may be raised by sowing the seed where the plants are to grow in the autumn or spring.

They may likewise be increased by planting out the off-set slips of the large bushy plants, taken off with root-fibres, in the autumn or spring, in the borders, or in beds for increasing their growth. The varieties may be preserved in this way with safety.

These plants afford variety in the borders and other parts; and the first sort is useful for the flowers.

VIOLET. See Viola.

VIOLET, DAMASK, and DAME'S. See HESPERIS.

VIOLET, DOG-TOOTH. See ERYTHRONIUM.

VIPER'S GRASS. See SCORZONERA.

VIRGA AUREA. See SOLIDAGO.

VIRGINIAN ACACIA. See ROBINIA.

VIRGINIAN CREEPER. See CLEMATIS.

VIRGINIAN GUELDER ROSE. See SPIRÆA OPULIFOLIA.

VIRGINIAN POKE. See PHYTOLACCA DECANDRA.

VIRGINIAN SILK. See PERIPLOCA.

VIRGIN'S BOWER. See CLEMATIS.

VITEX, a genus containing plants of the hardy and under-shrubby kinds.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a one-leafed perianth, tubular, cylindric, very short, five-toothed: the corolla one-petalled, ringent: tube cylindric, slender: border flat, two-lipped: upper lip trifid, with the middle segment wider: lower lip trifid, with the middle segment bigger: the stamina have four filaments, capillary, a little longer than the tube, two of which are shorter than the others: anthers versatile: the pistillum is a roundish germ: style filiform, length of the tube: stigmas two, awl-shaped, spreading: the pericarpium is a globular berry or drupe, four-celled: the seeds solitary, ovate.

The species cultivated are: 1. *V. Agnus castus*, Officinal Chaste Tree; 2. *V. incisa*, Cut-leaved Chaste Tree; 3. *V. trifolia*, Three-leaved Chaste Tree; 4. *V. Negundo*, Five-leaved Chaste Tree.

The first has a shrubby stalk eight or ten feet high, sending out their whole-length opposite branches, which are angular, pliable, and have a grayish bark: the leaves for the most part opposite upon pretty long footstalks; they are composed of five, six, or seven leaflets, spreading out like the fingers of a hand; the lower ones small, and the middle largest; they are smooth and entire; the largest are about three inches long, and half an inch broad in the middle, ending in blunt points, of a dark green on their upper side, but hoary on their under: the flowers are produced in spikes at the extremity of the branches, from seven to fifteen inches in length, composed of distant whorls; in some plants they are white, in others blue. They are generally late before they appear. They have an agreeable odour when they open fair, and make a good appearance in autumn, when the flowers of most other shrubs are gone. It is a native of Sicily.

There are varieties with narrow leaves, with broad leaves, with blue flowers, and with white flowers.

The second species has the stature of the preceding, but smaller in all its parts, with quinate acuminate pinnatifid leaves pubescent underneath. It is a shrub seldom rising more than three feet high, sending out on every side spreading branches, which are slender and angular: the leaves opposite upon pretty long footstalks; some composed of three, others of five leaflets, which are deeply and regularly cut on their sides, like pinnatifid leaves, and end in acute points: the largest of these leaflets is about an inch and half long, and three quarters of an inch broad in the middle; they are of a dull green colour on their upper side, and gray on their under: the branches are terminated by spikes of flowers three or four inches long, disposed in whorls; in some plants they are white, in others blue, and some have bright red flowers: they are in beauty from the middle of July to the beginning of September. It is a native of China.

The third has the leaflets ovate, acute, quite entire, tomentose underneath, the two nearest to the petiole smaller: the stem is shrubby, branched, round, eight feet high, the thickness of a finger, procumbent, sometimes creeping: the leaves ternate, seldom quinate: leaflets waved, dusky, green above, cinereous-hoary beneath, soft: common petioles long, opposite: the flowers violet in dichotomous, terminating racemes: the fruit small, globular, hard, smooth, black, like pepper, four-seeded. It is a native of the East Indies.

The fourth species has the stem arboreous, twisted, the thickness of the human arm, with spreading branches: the leaflets lanceolate, for the most part quite entire, but sometimes serrate, flat-veined, of a dusky ash colour, on opposite petioles: the flowers purplish, in loose, terminating, erect racemes. It is a native of the East Indies.

Culture.—The first sort may be increased by cuttings and layers: the cuttings should be planted out in the early spring, in a fresh light soil, being often refreshed with water till they have taken root; afterwards the plants must be kept clear from weeds, and be protected during the following winter with mulch or mats; and about the middle of the following March, when the season is fine, be removed into the places where they are to grow, or into the nursery for two or three years to become strong; being pruned up to form regular stems.

The layers of the branches may be laid down in the spring, being careful not to split them,

watering them in dry weather; when in about a year they may be taken off and planted out in the same manner as the cuttings.

The second sort may likewise be increased by cuttings, which should be planted in pots, plunged in a moderate hot-bed, covering them with glasses; when well rooted they may be taken up, and be planted in separate small pots filled with light earth, placing them in the shade till fresh rooted, afterwards placing them in a sheltered situation, with other green-house plants, until the autumn, when they must have protection from frost, and have very little water. They are late in putting out leaves in the spring, so as almost to appear dead.

The third sort is raised from cuttings, which should be planted in pots in the early spring, as April, plunging them in a moderate hot-bed, covering them with hand-glasses, being slightly watered; when they have taken root, they should have free air admitted in a gradual manner; then they may be taken up and planted out in separate pots filled with light earth, replunging them in the bed, and giving due shade. They should afterwards have plenty of free air when the weather is suitable, being treated as tender plants. It must be constantly kept in the stove, having free air in the summer season. It retains its leaves all the year. This may also be raised from layers.

The fourth sort may also be raised from cuttings, in the same manner as the second.

The first sorts may be introduced in the shrubberies, clumps, &c., and the latter kinds afford variety in stove and green-house collections.

VITIS, a genus containing plants of the deciduous climbing kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Hederaceæ*.

The characters are: that the calyx is a five-toothed perianth, very small: the corolla, petals five, rude, small, caducous: the stamina have five awl-shaped filaments, from erect spreading, caducous: anthers simple: the pistillum is an ovate germ: style none: stigma obtuse-headed: the pericarpium is a globular or ovate berry, two-celled: the seeds two, bony, turbinate-cordate, contracted at the base, semibilocular.

The species cultivated are: 1. *V. vinifera*, Common Vine; 2. *V. Indica*, Indian Vine; 3. *V. laciniosa*, Parsley-leaved Vine; 4. *V. arborea*, Pepper Vine.

The first is universally known to have a thick twisted irregular weak stem, covered with a brown cloven bark, and having very long tough flexible branches, trailing along the ground, or climbing trees by means of tendrils: the leaves are lobed and sinuated, serrate, smooth and alternate, on long foot-stalks: the tendrils are opposite to a leaf, and are attended by the flowers in a raceme: the flowers are whitish or herbaceous, very small and insignificant in appearance, but having a very agreable smell: the petals cohering at the tip and concealing the genitals in manner of a veil, but soon fall off: the berry globular, in some varieties ovate, before it is ripe regularly divided into five cells, but afterwards one-celled, almost pellucid, coloured in some, colourless in others. It is a native of most of the temperate parts of the world. In very cold regions it refuses to grow, and within 25° or even 30° of the equinoctial line, it seldom flourishes so as to produce good fruit. In the northern hemisphere, the proper wine country is from 25° to 51° of latitude.

According to Forsyth, the following are the varieties which are in most esteem in this climate, for the hot-house, vinery, and the natural wall.

SORTS PROPER FOR THE HOT-HOUSE.

The White Muscat of Alexandria, or Alexandrian Frontinac, in which the berries are oval, and the bunches long. It has a rich vinous juice, and is esteemed an exceeding good grape for the hot-house.

The Red Muscat of Alexandria, which resembles the former, only the berries are of a red colour.

The Black Muscadel, which has large oval berries of a black colour and pleasant juice.

The Red Muscadel, which has large red berries of an oval shape, and ripens late; the bunches are very large.

The Black Damascus, which has large, round, black-coloured berries; the flesh is rich and well flavoured. It is an excellent late grape.

The Black Grape from Tripoli, which has large black berries, and is an excellent grape.

The White Hamburgh, which has large oval-shaped berries, and is a pretty good bearer.

The Red Grape, from Syracuse, which is a very fine large grape.

Le Cœur Grape, or Morocco Grape, which has berries of a tawny colour, and is highly esteemed.

The Golden Galician Grape, which has large oval berries of a yellow colour, and tolerable flavour.

The Black Raisin Grape, which has large black berries of an oval form; the skin is thick, and the flesh firm.

The White Raisin Grape, which resembles the preceding; only that the berries are white.

The Malvoise, sometimes called the Blue

Tokay, which has small brownish berries powdered with a blue bloom; the juice is vinous.

The Syrian Grape, which has large, white, oval berries, with a thick skin and hard flesh, and is a good bearer.

The Damson Grape, which has very large berries of a purple colour.

The Cornichon Grape, which has berries of a remarkable shape, long and narrow, of a white colour, with a firm sweet flesh.

The Red Chasselas, which is very like the Chasselas Blanc in size and shape, but is of a dark-red colour; it is a very good grape, but ripens later than the White.

SORTS PROPER FOR THE VINERY.

The Red Frontinac, or Muscat Rouge, which is a very fine grape, and greatly esteemed: it has large brick-coloured berries, and the juice is of a highly vinous flavour.

The Large Black Cluster, which is larger than the former, and has a very rough harsh taste. Mr. Speechly says, that he had this grape from Lisbon, and was assured that it is the grape of which they make red port wine. He has had the same grape eight or ten years.

The White Grape, from Alcobaca, which bears large bunches of white juicy berries.

The White Parsley-leaved Grape, or Ciotat, which has round berries, white, juicy, and sweet. There is a sort of the Parsley-leaved Grape with red fruit.

The White Corinth Grape, which has a small round berry, with a fine juicy flesh of an agreeable flavour.

The St. Peter's Grape, which has a large oval berry, of a deep black colour when ripe; the bunches are large, and the flesh juicy; it ripens late.

SORT PROPER FOR THE WALL.

The White or Common Muscadine, by some called the Chasselas, which resembles the Royal Muscadine, but the berries are smaller; and, although it is not so sweet as the Royal, it is the best grape that we have for a common wall, and a great bearer.

SORTS PROPER FOR THE HOT-HOUSE AND VINERY.

The Black Muscadine, which is a good bearer, and the berries are beautifully powdered with a blueish bloom.

The Royal Muscadine, D'Arboyce, or Chasselas Blanc, which is an excellent grape; the bunches are large, and composed of round amber-coloured berries of a rich vinous taste. In a fine season it ripens in September.

The White Muscat, from Lunel, which has large oval berries, of an amber-colour, and full of a vinous juice. It is a plentiful bearer, and highly esteemed.

The Black Spanish, or Alicant Grape, which has black berries of a pleasant flavour.

The Black Grape from Lisbon, which has large round juicy berries, and the bunches resemble the Black Hamburgh. It is a good grape.

The Black Frontinac, or Muscat Noir, which has pretty large round berries, black when ripe, and covered with a mealy powder.

The Grizzly Frontinac, which has round berries, of a colour composed of brown, red, and yellow. It has an excellent flavour.

The Black Hamburgh, which has the bunches large, composed of large oval black berries, of a pleasant sweet juice and vinous flavour. It ripens in November.

The Red Hamburgh, which has thin-skinned berries of a dark-red. They have a rich vinous flavour, and ripen about the same time with the former.

The White Morillon, which has an oval-shaped juicy berry, and the leaves are downy on the under side.

The Aleppo Grape, which has middle-sized berries, with a juicy flesh of a very fine flavour. It is a curious grape, frequently striped black and white.

The Genuine Tokay, which is a white grape, with a thin skin, delicate flesh, and agreeable juice.

The Lombardy Grape, which has fine, large, flame-coloured berries, full of a fine juice; and the bunches grow to a great size, frequently weighing more than six pounds.

The Smyrna Grape, which has a large red berry, of a very fine flavour, and is esteemed a very good grape.

The Brick Grape, so called from its colour, has small berries, but the juice is sweet.

The Claret Grape, which has small black berries with a blood-red juice; but the grape is very harsh, if not perfectly ripe.

The Cat's Grape, which has small berries, of a pale-green colour; the flesh is soft and juicy, but of a very disagreeable taste, unless quite ripe.

The Greek Grape, in which the berries are of a blueish white colour; and it is esteemed a fine grape.

The Black Corinth, or Currant Grape, which has a small roundish berry, generally without a stone, of a deep black colour; it has a sweet juice, and ripens in October.

The New Muscat of Jerusalem, which has large round berries of a red colour; some of which, in fine seasons, are as large as a gooseberry; but, as it does not ripen well on

the natural wall in this country, it might be worth while to try it in a hot-house or vinery.

The Black Prince, which has fine large berries, and the bunches grow to a large size: Mr. Forsyth has had them in a favourable season, on the natural wall, weighing a pound and a half; it ripens on the natural wall in October. It deserves a place in the hot-house and vinery.

SORTS PROPER FOR THE VINERY AND WALL.

The July Grape, or Morillon Noir Hatif, is a small round black berry of a sugary juice; and is principally esteemed for being early ripe, which is in September.

The Malmsey Muscadine somewhat resembles the preceding; the juice is very sweet, and of a high flavour. This is a good bearer, and a very fine grape.

The Black Sweet Water has a small roundish berry, of a sweet taste; but, being apt to crack, is not in much repute. The birds are very fond of this grape, which ripens in September.

The Small Black Cluster has small oval berries; the leaves are covered with a hoary down. This is a very pleasant fruit.

The Early White Grape, from Teneriffe; the berries are of a middling size, and the flesh remarkably sweet and juicy.

The Auverna, or True Burgundy Grape, sometimes called the Black Morillon, is an indifferent fruit for the table, but is esteemed one of the best for making wine.

SORTS PROPER FOR THE HOT-HOUSE, VINERY, AND WALL.

The White Sweet Water, which has a large berry of a white colour, and very agreeable juice; it is esteemed an excellent grape, and ripens in September.

The White Frontinac, or Muscat Blanc, which has large bunches composed of round berries: the juice of this grape, when fully ripe, is exquisite.

To this list are added the following sorts, without any descriptions:—

The Black Frankindale, the Black Gibraltar, the Black Muscat of Alexandria, the Miller Grape, the New White Sweet Water, the Passe Musk, the Pearl Muscadine, the Red Constantia, the Red Raisin, the Sir Abraham Pitcher's Fine Black, the West's St. Peter, the White Constantia.

The following are the sorts recommended for a small garden, by the same author:—

"The White Muscadine, White Sweet Water, Black Sweet Water, Large Black Cluster, Small Black Cluster, the Miller Grape; and the St. Peter's, and the Black Hamburgh, answer well in favourable seasons."

The author of the Scotch Forcing Gardener observes, that "amongst the numerous varieties of grapes, he does not know above eighteen or twenty kinds worth a place in the vinery, and even that number cannot have places in an ordinary-sized house; but where there are two or three houses, a variety to the extent of twenty-four kinds may be encouraged, without transgressing the bounds of moderation." The following is the list which he advises:—

White Sweet Water, White Muscadine, Royal do. Black do. Black Frontinac, White do. Red do. Grisly do. Black Hamburgh, White do. White Raisin, Red do. Syrian, White Tokay, Flame-coloured do. White Passe Mosque, Grecian, White Muscat of Alexandria, Black do. Large Black Cluster, Black Constantia, White do. St. Peter's Grape, Lombardy.

Out of which, he thinks, the proprietors of grape-houses may choose so as to stock any grape-house.

The second species has the trunk woody, sending out many slender branches furnished with branching tendrils, by which they fasten themselves to trees: the flowers in bunches like those of the other sorts; succeeded by berries or grapes of an austere taste: the size of the common vine, but with gray hairs scattered over the whole: the leaves undivided, almost smooth above, but villose and veined beneath with thick vessels: it has a simple tendril from the axils, and simple raceme from the middle of the tendril: the flowers white, like those of the common vine, and equal, on small lateral racemes: the berries round, brownish-green, small, watery, acid, eatable. It is said to produce a great quantity of small black grapes in the lower hills of Jamaica; but they are of a rough taste, and would doubtless make an excellent red wine if properly managed. It seems to thrive best in the Red-hills. It is there known by the name of Water-withe. It is a native of the East and West Indies, &c.

The third has the stalks and branches like those of the common grape, but the leaves are cut into many slender segments: the grapes are round, white, and disposed in loose bunches. It is now little known, as the fruit has little flavour, and ripens late in autumn; only a few plants are preserved for the sake of variety.

The fourth species has the stem woody, sending out many slender branches, which climb by tendrils: the leaves are composed of many smaller winged leaves, divided somewhat like those of common Parsley, of a lucid green on their upper side, but much paler on their under: the flowers axillary in loose bunches, very small, white, composed of five small petals, which ex-

pand and soon fall off: they are not succeeded by any fruit in this climate; but the berries which come from North America, their native place of growth, have generally three seeds in each of them.

Culture.—The vine may be increased in different ways: as by seeds, cuttings, layers, as well as grafting and inoculation; but the cutting and layer methods are the most commonly employed.

In raising vines from seeds, they should be sown in the early spring, as about the beginning of March, in small pots filled with mould of the light fresh kind, to the number of three or four seeds in each, plunging the pots in a moderate hot-bed, the mould being gently sprinkled over with water, from a fine-rosed watering pot, every day when the weather is hot and dry, which should be performed in the latter part of the day as the sun disappears from the frame. But when the season is such as to keep the mould in the pots properly moist, the waterings may be omitted. As soon as the waterings have been performed, the frames should be shut down, and be kept in that state during the night when the heat is not too great.

When the heat of the bed begins to decline, a lining of horse dung and fresh leaves should be added; or the heat be renewed by stirring the old beds up and making slight additions to them. This should be continued till the plants have acquired sufficient strength to support themselves without bottom heat.

It will be necessary about the end of August, Mr. Forsyth says, "to take the lights off, that the plants may be hardened before winter, taking care to shelter them in frames covered with mats, which will prevent the frost in the latter end of October and beginning of November from injuring the tender shoots."

And when the plants are about six inches high, they should, he says, "be transplanted singly into deep pots, forty-eights, filled with the same sort of vegetable mould that is directed to be used for vines; taking great care not to hurt the roots, nor to break the leaders; then plunging them again into the hot-beds: but if the heat of the old bed be too much decayed, it will be necessary to have a new one prepared before-hand, to receive the pots as soon as the plants are transplanted. When they grow vigorously, it will also be necessary to shift them into thirty-twos. When the plants are above six inches high, they should, he says, be carefully tied to small rods, leaving only one stem for the first year. The rods should be as high as the frames will permit." And when the leaves begin to drop, they should, he says, "be carefully picked off the pots, to prevent the plants from getting mouldy, which would very much injure their growth."

He likewise advises, that they "should be kept under frames, or put into the green-house, in hard winters, to shelter them from severe frosts. In the spring, about March or the beginning of April, if from seed ripened in this country, they may be planted out against the walls where they are to remain; but, if from seed imported from vine countries, he would advise not to plant above one or two against the wall, or in the hot-house, before a specimen of the fruit has been obtained, and proof afforded that the vines are worth cultivation." It is likewise recommended that after they are planted, they should be cut at the third eye, if strong; but at the second, if weakly; at the same time rubbing off the lower bud with the finger and thumb, as directed below.

Where the method by cuttings is made use of, these should be chosen from the shoots that are best ripened, and have the shortest joints; always having one or two joints of the last year's wood, cutting it perfectly smooth and a little rounding at the lower end, and as near to a joint of the old wood as possible. The upper end should also be cut smooth and sloping towards the wall; but if they are planted in beds or borders, the cut should always face towards the north. When cuttings are planted against piers or walls, it should be at about a foot distance from each other, according to the vacant space, and so deep as to have the second eye level with the ground, constantly rubbing off the lower eye; as by this means, where no accident happens to the top bud, there will be a shoot produced from each eye, with a little one under, which should always be rubbed off as soon as it begins to swell; as if suffered to grow to any considerable size there will be danger of injuring the large one in rubbing the small one off. All the runners and side-shoots should likewise be picked off as directed above, leaving only two shoots, which should be trained at their full length. About the beginning of February they may be pruned, leaving one or two eyes on each according to the strength of the shoot, which should be managed as explained below.

"For the first year," Mr. Forsyth says, "especially if the summer be dry, and proper attention be not paid to the watering of them, they will make but little progress; but in the second year it may be plainly discerned which is the strongest plant, which only should, he says, be left to fill up the vacant space on the wall; the rest should be taken up and planted in other situations where they are wanted for fruit."

A method is made use of by Mr. Speechly and others, of propagating the vine from one eye, and a few inches of the preceding year's wood, which they prefer to those raised by cuttings in the common way, on these accounts: "they have more abundant roots, grow shorter jointed, are more prolific, and will, if permitted, come into bearing the second year."

It is advised that choice should be made of cuttings after a warm dry season, when the wood ripens well; each cutting having two inches of the old wood, with one eye of the new. When the vines are pruned there is great choice; they should therefore be then selected of a middling size, the wood round and perfectly ripened.

After this, pots are to be filled with rich light mould, that has been well meliorated and prepared some time before. The cuttings being then prepared for planting, by the bottom part being cut perfectly smooth; if any of the old dead snags remain, they should be cut off close to the quick wood, and the top cut sloping towards the back of the hot-house or frame, when placed in them. Mr. Forsyth recommends "planting only one cutting in each pot, which as to size should be a deep forty-eight; by that means he thinks the plants will grow much stronger and quicker than when many are crowded together, and the sun and air will have a freer admission to ripen the wood; for, when many are planted in one pot, they shade one another, and in a considerable degree prevent the sun and air from passing freely among them. When the plants begin to get strong, and the pots full of roots, it will be necessary to shift them from the forty-eights to thirty-twos." "This mode is," he says, "best adapted for private gardens; but for nurserymen, &c., who raise plants for sale, and cannot conveniently spare so much room, it may be necessary to plant three or more cuttings in each pot."

And in these cases the same rules for watering, transplanting, shifting, &c., are to be attended to as was directed for the seedling plants.

Mr. Forsyth observes, that it is "a method very frequently practised by nurserymen and gardeners, when they wish to have their plants fit for sale the same year, to plant them in pots, and place them in the hot-house among the tan, on the flues, or round the curbs of the pit. And he has seen it employed with great success. In this way they may," he says, "be raised either by planting them singly in small pots, or several in a pot, according to its size, planting them out separately when they have taken root, having a hot-bed ready to plunge the pots in as soon as they are transplanted. In this manner they become much forwarded in their growth, and are before the autumn in a state fit for sale."

In raising vines in the layer manner, the method usually made use of is by stools, in the open quarters of the garden, in the same manner as nursery-men propagate forest-trees and shrubs: but the best way, according to Forsyth, is to take layers from these on walls or palings, training the shoots at full length during the summer; when about the month of February some of the finest and strongest shoots should be chosen, laying them across the foot-path into pots (twenty-fours or sixteens) filled with fresh mould, and plunging them in the ground about two inches below the surface; at the same time making an incision or two in the old wood, or giving it a twist just below a joint; and though they will generally take without notching or twisting, it is nevertheless advised, as the surest way, to have that done. The layers should then be cut, leaving two or three strong eyes upon each. And when the shoots begin to run, they should be tied to long stakes, to prevent their being broken by the wind; all the runners and side-shoots being picked off, leaving only two or three fine strong shoots on each plant, which should be trained at full length during the summer season.

As soon as the shoots are laid down, it will be necessary to mulch them with good rotten dung, or rotten leaves, which will keep the mould moist; and in very dry summers, a good watering should be given once or twice a week: this will wash in the dung or leaves about the roots, and induce the layers to shoot with more vigour. Mr. Forsyth says, "that in this method of laying, two or three rows of layers may be had from one wall: taking care to lay the branches alternately, and to keep the pots plunged about two inches below the level of the ground."

The same writer advises in choosing vines from the nursery, to select "those which have the strongest and longest shoots."

He observes that where the above directions are properly attended to, the plants will be well rooted in the pots before autumn, and fit for planting in vineries, hot-houses, or other situations. And when they are to be planted out, they should, he thinks, be carefully cut off from the mother vine and carried in the pots to where they are intended to be planted; taking care to preserve the balls as much as possible when they are turned out of them.

It is added that "if the season be warm and fine, the grapes of the early kinds ripen very well on these layers before they are taken up; and, if properly managed, they will bear some fruit the first year after planting. One of the

strongest shoots must, he says, be left nearly at full length, cutting it as high as the uppermost full bud, leaving nothing but round well-ripened wood. If there are three shoots, the remaining two should be cut so as to leave only two full eyes upon each, which should be trained at length, as before directed, to produce fine wood for the next year. The shoot which was trained the preceding year should then be cut down, leaving only two strong eyes to produce wood for the following year; and so on every year, cutting the branches alternately: by this means the walls always may be kept covered with fine healthy bearing wood, and a great deal of time be saved in furnishing hot-houses, vineries, and other places. It is remarked that "this method of laying is practised with great success, by many nurserymen in the neighbourhood of London."

In the producing of vines by grafting, choice should be made of cuttings for grafts, or scions, from the best-bearing branches of the sorts intended to be propagated at the season of pruning. In general the bottom part of the last year's shoot is to be preferred; but in well-ripened vigorous wood, any part of the shoot will answer, provided it be not too long jointed. These cuttings should be preserved in pots filled with light sandy earth till the time of grafting.

The periods for performing the operation are different according to the vines; for those in the pine stove, the beginning of January may be proper, but the middle of March for those growing in the open air. In general they should be grafted about three weeks before they begin to break into bud. And upon small stocks not more than an inch in diameter, cleft-grafting is the most proper; but upon larger stocks, whip-grafting is to be preferred. In both methods care should be taken in fitting the stock and scion together, and the operation should be performed with great exactness; fastening them together with bass matting, and covering them with clay in the usual way. After the operation the scion will sometimes begin to push in a few weeks, but it frequently remains dormant two or three months; during this period the stock must be stripped of all its shoots as soon as they appear; and to preserve the scion in a vegetative state, the clay must be kept moderately moist, by wrapping wet moss round it, and by keeping the moss constantly sprinkled with water. And when it has made shoots five or six inches long, the clay and bandage must be carefully taken off.

The method of grafting by approach is advised by some, however, as the best mode of raising vines. In this case it is necessary to have the plant intended to be propagated, in a pot. Strong plants, that have been two or three years in pots, are to be preferred; but plants from the nursery may be potted, and grafted in the same season, if brought into a hot-house or vinery. It is suggested that fine grapes and good wood may be obtained even the first season, by any of these methods, but particularly by the last; in which it is evident the graft has a double support, as from the stock, and the plant in the pot.

In this sort of grafting the clay and bandage should remain two or three months after the graft has formed an union; for, if it be taken off sooner, the graft will be very liable to spring from the stock. The pot should be plentifully supplied with water till the month of August, when the graft should be separated from the plant in the pot. Two or three inches of wood below the bottom of the graft may be left, but should be taken clean off at the next pruning in winter.

The Syrian Vine is recommended as the most proper for stocks, and plants of this sort raised from seeds are greatly preferable for this purpose to plants raised either from layers or cuttings.

The principal advantages of the grafting mode of raising vines are; that if a wall should have been planted with bad kinds, instead of stubbing them up, and making a new border, by which several years must elapse before the wall can again be completely filled, in this way their nature may be changed immediately; as good grapes may be obtained from the same year's graft; and in a hot-house the grafts, if permitted, will frequently shoot thirty or forty feet the first summer; that in small vineries or frames, where great variety could not be had in the common way, it may be procured by this means on the same plant;—and that of the improvement of the various kinds, particularly the small ones, which generally make weak wood. The method by inoculation may likewise have advantages in some cases of a similar kind.

When any of the vines that have been raised from seed do not prove of a good flavour, they are proper for grafting or inarching the finer sorts of vines on; for, as the coarser sorts grow more vigorously than the finer, they are, on that account, more fit for grafting or inarching.

It is remarked, that "the best manure for vines is a mixture of vegetable mould, rotten spit-dung, and fresh loam (turf and all); this should be thrown in a heap, and frequently turned, for a year or two before it is made use of."

Pruning and Training Vines.—In the management of the vines after being thus raised and

trained, as they rarely produce any bearing shoots from wood that is more than one year old, care should be taken to have such wood in every part of the trees; for the fruit is always produced upon the shoots of the same year, which come out from buds of the last year's wood. The method practised by gardeners is to shorten the branches of the former year's growth, down to three or four eyes, at the time of pruning; though some leave these shoots much longer, and think that by this practice they obtain a greater quantity of fruit: but what is gained in quantity is probably lost in quality; therefore the best method is perhaps to shorten the bearing shoots to about four eyes in length, as the lowermost seldom is good, and three buds are sufficient, as each will produce a shoot, which generally has two or three bunches of grapes: so that from each of those shoots there may be expected six or eight bunches, which is a sufficient quantity. These shoots must be laid in about eighteen inches asunder; as where they are closer, when the side shoots are produced, there will not be room enough to train them against the wall, which should always be provided for; and as their leaves are very large, the branches should be left at a proportionable distance from each other, that they may not crowd or shade the fruit too much.

In the winter pruning of the vines, it is advised to make the cut just above the eye, sloping it backward from it, that, if it should bleed, the sap may not flow upon the bud; and where there is an opportunity of cutting down some young shoots to two eyes, in order to produce vigorous shoots for the next year's bearing, it should always be done, as in stopping of those shoots which have fruit upon them as soon as the grapes are formed, which is frequently practised, it often spoils the eyes for producing bearing branches the following year. The usual season for this pruning is the end of October.

About the end of April, or the beginning of the following month, when the vines begin to shoot, they should be carefully looked over, rubbing off all small buds which may come from the old wood, which only produce weak dangling branches; as also when two shoots are produced from the same bud, the weakest of them should be displaced, which will cause the others to be stronger; and the sooner this is done the better. And in the middle of the last month they should be gone over again, rubbing off and displacing all the dangling shoots as before, and at the same time fastening up all the strong branches, so that they may not hang from the wall; for, if their shoots hang down, their leaves will be turned with their upper surfaces the wrong way, and when the shoots are afterwards trained upright, they will have their under surface upward; and until the leaves are turned again, and have taken their right position, the fruit will not thrive; so that the not observing this management will cause the grapes to be a fortnight or three weeks later before they ripen: besides, by suffering the fruit to hang from the wall, and be shaded with the closeness of the branches, it is greatly retarded in its growth; therefore during the growing season you should constantly look over the vines, displacing all dangling branches and wild wood, and fasten up the other shoots regularly to the wall; and towards the middle of June the bearing branches should be stopped, which will improve the fruit, in doing which three eyes should always be left above the bunches. But though this is practised on those shoots which have fruit, it is not to be performed upon those which are intended for bearing the next year, as these must not be stopped until the middle of July, as by stopping them too soon it may cause the eyes to shoot out strong lateral branches, and in that way injure them. In the summer season care should be taken to rub off all dangling branches, and train up the shoots regularly to the wall as before, which greatly accelerates the growth of the fruit, and admits the sun and air more freely to them, which is necessary to ripen and give the fruit a rich flavour; but the branches should not be too much divested of their leaves, as is the practice with some.

Mr. Forsyth has, however, attempted another mode of pruning and training vines, from trials made on vines planted against the piers of a south wall, among peaches, nectarines, and plums, &c., in which the fruit was so small and hard as to be unfit for the table. They had been trained upright, which induced such a luxuriance of growth as made the sap to flow into the branches in the place of the fruit. "He let," he says, "in 1789, two strong branches grow to their full length without topping them in the summer, and in the following year trained them in a serpentine form, leaving about thirty eyes on each shoot, which produced one hundred and twenty fine bunches of grapes, weighing from one pound to a pound and a quarter each. Every one that saw them said that the large ones were as fine as forced grapes; while the small ones produced from branches of the same vine, trained and pruned in the old way, were bad natural grapes, and not above twice the size of large currants. And in order more fully to prove the success of the experiment, he next year trained five plants in the same way, allowing the shoots intended for bearing wood to run

to their full length in summer, training them wherever there was a vacancy between the old trees; where there was none, he ran them along the top of the wall, without topping them. In winter he trained them in a serpentine manner so as to fill the wall as regularly as possible; they were, he says, as productive as those in the former year. And after a three years' trial, he thought he was warranted to follow the same practice with the whole; when in the year 1793 he sent, he says, for the use of his majesty and the royal family, three hundred and seventy-eight baskets of grapes, each weighing about three pounds, without planting a single vine more than there were the preceding year, in which he was able to send only fifty-six baskets of the same weight; and those so bad and ill-ripened that he was ashamed of them, as they were not fit to be sent to the table."

This, he thinks, sufficiently proves the great advantage that the serpentine method of training possesses over the common method. He advises that the shoots should be brought as near as possible from the bottom of the vine, that the wall may be well covered. When the walls are high, and the shoots from the serpentine branches strong, they are sometimes let remain; but if the walls are low, and the serpentine branches produce weak shoots, they are cut out in the autumnal pruning, and the strongest of the young wood trained up in their room.

As the size and fineness of the bunches of grapes depend in a great measure on the bearing wood being strong and well ripened, great attention should be paid to these circumstances. Where the vines produce small bunches, they should be cut down to two or three eyes, in order to have strong wood for the ensuing year. And as it has been seen that vines bear their fruit on the wood that was produced the preceding year, when there is a great deal of old naked wood on them, as generally is the case, with some small weak shoots at the extremities, they should always be cut down as near to the ground as possible, in which case there will be no fruit for that year. But another mode is sometimes practised, which is to cut every other shoot, leaving the old ones to produce some small grapes; when in the following year there will be plenty of fine wood, provided care be taken to nail in the strongest shoots, and pick off all the side-shoots that are produced from the eyes, pinching them off with the finger and thumb, or cutting them out with a sharp penknife close to the bud or eye; but never twisting them; as by twisting them the bud that produces the grapes the next year is hurt; being always attentive to cut as near to a bud as possible, and taking care to lay in the wood very thin in the summer season, that the sun and air may be freely admitted to ripen it well, as by these means it will grow very strong. Great care should also be taken to keep the shoots nailed to the wall, which will prevent their being broken by high winds; picking off all the side-shoots every time they are nailed, which should be done several times during the summer months, according to the quickness of their growth. In fine weather they grow so very rapidly that it is necessary to look them over once every fortnight or three weeks to have them in good order. The vines should never be suffered to run together in a cluster, and mat, as it infallibly ruins them for bearing the succeeding year. The shoots that have been trained in a serpentine manner, are advised by Mr. Forsyth to be topped, as soon as the grapes come to the size of very small green peas, at a joint or two above the fruit; but neither the leading shoot, nor that which is intended to bear fruit the next year, should ever be topped.

In the second year Mr. Forsyth never recommends "the pruning of vines to be performed till the beginning of February, except in such seasons as are very forward. It is, however, the common practice with some to begin pruning soon after the fall of the leaf, before the wood becomes hard; but if a frost sets in before the wood is hard, in particular after wet summers and autumns, it is apt to be very much injured; he has frequently seen it almost killed after autumnal pruning. And he observes that there is often fine weather in the months of October, November, and December, with sun and drying winds, which helps to ripen the wood after wet autumns."

It is advised, "when the vine leaves begin to fall, to take a soft broom and sweep them off upwards in a gentle manner, which will be of great service in assisting to harden the wood." In beginning to prune in February, it is recommended always to make choice of the strongest and longest shoots, leaving them as long as the eyes are found good and plump, and the wood round; but by no means to leave them when they become flat, as in that case they seldom bear fruit; and if they do, it will be very small. Mr. Forsyth never lays in any that has less than fifteen, and from that to thirty good eyes, according to the strength of the shoot, which will produce two bunches from every good eye. He has had seventy bunches of grapes from one shoot. The shoots that have borne fruit in the preceding year should be cut out the next year, except where the wall is to be filled and the shoots are very strong. Plenty of fine healthy young wood is easily provided, if care be taken

in the winter pruning; therefore, none should be left but the fine strong wood, cutting constantly at the second, third, or fourth eye; rubbing the lowest bud off, and that which comes out at the joint between the new and last year's wood. By these means as much fruit will, he says, be procured from these short shoots as by the common way of pruning. It is necessary to leave two or three of the strongest shoots for next year's bearing wood, and never to top them. When there is not room to train them, they may be led over the tops of the other trees, if the vines are planted against piers; or be run behind the standards, if there be any, which is generally the case where the walls are high. In this way all the wall will be covered, which will have a very beautiful appearance when the fruit is ripe, besides furnishing a plentiful supply of fine grapes. The shoots at the bottom of the wall may be run behind the dwarf trees, or be tacked down over the top of the wall on the other side where the walls are low. Mr. Forsyth has had very fine grapes on east and west walls, in good seasons, between peaches, plums, &c., particularly when the trees are young." In these cases he advises to "keep cutting in the vines as the other trees grow and fill up the walls. He also trains them over the tops of trees on each side; which, he says, never does any harm to the trees below, provided they are kept nailed to the wall. He has also planted vines between trees on north and east aspects, and trained them over the tops of the south and west walls to fill the upper parts, till the peaches and nectarines cover them." He then cuts away part of the vines, leaving only as many shoots as he may think necessary. "Two years ago, he says, he removed some old apricots that covered a wall about one hundred and sixty-five feet long, and planted them against a new wall, leaving five vines that were planted against the piers. These five plants have, in the course of two years, covered the above wall from top to bottom, and bear plenty of fine grapes every year. He says he also moved an old vine on a wall near to the above, and cut it in pretty close, when it has in three years spread twenty-six yards, and bears very fine fruit. And against one of the piers had, he says, been planted a black Hamburgh grape, and at the other side of the same pier a Muscadine, at the distance of about two feet from each other; he pruned them both according to his method, and the second year after, they produced one thousand one hundred bunches of fine grapes." It is added "that he also tried an experiment by taking some shoots from a south wall, opening the ground deep enough to lay them in across the footpath at the distance of about four feet from the wall, and tied them to stakes, training them as espaliers, laying in the wood as directed for walls, and keeping them as low as possible, that they might not shade the bottom of the wall; he also pruned them as he does those against walls, laying the shoots in very long, except those that were intended to bear fruit next year, from which he took off all the side-shoots and runners against the wall and espaliers. In a favourable season these bear, he says, very fine fruit. better than what is got from the walls by the old method of pruning."

The use of the composition is advised as soon after pruning as possible; for, as the vine is very porous, it soon imbibes the wet and moisture, which brings it quickly to decay. He adds, that "if at any time a vine should be cut late in the season, it will be apt to bleed much; in which case the powder should be applied, repeating the application till the bleeding stops." He states that he "cut two strong vine-branches in the month of June, and three more in July, in very hot weather, on purpose to try the effect of the powder in stopping the bleeding. The sap rose so strong that it worked out at the top in a froth; he applied the powder, which in a short time entirely stopped it." These directions are chiefly for vines on the natural wall, though the same method has been advised to be practised for forced grapes.

Grape-vines require a dry light soil, and such a situation as has a full south aspect.

Mr. Forsyth advises, "after the grapes are set and begin to swell, to water them with the barrow engine, sprinkling them all over the leaves and fruit, pressing the fore finger over the top of the pipe; by which the water can be thrown as fine as small rain, which will wash all the dust off the vines and leaves, that are frequently covered with it, especially where the garden is near a public road. The insects should likewise be washed off the trees. In fine weather he sprinkles all the wall-trees three times a week, which keeps them clear from insects, and promotes the swelling of the fruit; but this operation must never, he says, be performed when the nights are cold and frosty. The sprinkling of the trees should be begun when the sun is in an oblique direction, or gone off the wall, which may be about four o'clock on a south aspect; as by doing it at this time the leaves will have time to dry before night, and so prevent the frost, if there should be any in the night, from injuring them. In very hot and dry weather the trees should have a good bottom watering once

a week; which will forward the swelling of the fruit. Vines require a great deal of watering; but when the fruit is fully swelled, you should leave it off, particularly when the nights begin to get cold, as it would hurt the flavour of the fruit.

"In order to preserve the grapes, as soon as the large fly makes its appearance, plenty of bottles a little more than half filled with some sweet liquor should be provided to entice the flies to enter them, where they will be drowned. The bottles should be hung on the nails at proper distances all over the vines, and also some of them placed at the bottom of the walls. The blue fly comes much earlier than the wasp, and is no less destructive to the fruit. It is therefore necessary to hang up the bottles betimes, in order to destroy as many of them as possible before the wasp makes its appearance, to have the bottles ready for this second enemy.

"When the grapes begin to ripen, the birds begin to attack the fruit; when it is necessary to bag some of your fine handsome bunches, but to bag them all would be an endless trouble where there is a full crop and a large garden.

"Of course where the bunches are very thick, the quickest way is, he says, to cover the trees with nets, or buntine (a kind of stuff of which ships' colours are made), which will admit a free air to the grapes, and dry soon after rain. They will also in the spring, he thinks, be a good covering for the trees, in cold, wet, or snowy weather. The bunches of grapes should always be kept under the shade of the leaves till they begin to ripen; when you may begin to pick off the leaves which cover the fruit (leaving those a little above it to be a shelter from the wet and frost in the nights); this will assist the ripening of the fruit; and take off only a few leaves at a time, according to the quantity of grapes to be gathered at once; by these means the fruit will continue three times as long in succession as it would if the leaves were picked off all at one time. He has often seen all the leaves taken off from the fruit soon after it was set, which prevents it from swelling, and it becomes hard and small, and generally cracks. When the leaves are not too thick, they admit, he says, the rays of the sun to pass through, and a warm glow of heat will be reflected from the wall.

"It is often convenient to let the grapes hang as long on the walls as possible; he has often let them hang till the middle of November, only covering them with nets, or buntine. But when the frost begins to set in sharp, they should then be gathered. Where there are several bunches on one branch it may be cut off, leaving about six inches in length, or more, of the wood, according to the distance between the bunches, and a little on the outside of the fruit at each end; both ends being sealed with some common sealing wax, such as wine merchants use for sealing their bottles with, which you may buy at the wax chandler's; then hang them across a line in a dry room, taking care to clip out, with a pair of scissars, any of the berries that begin to decay or become mouldy, which if left would taint the others. In this way he has kept grapes till the sixth of February; but if they are cut before the bunches are too ripe, they may be kept much longer than that period.

"They may also, he says, be kept by packing them in jars, (every bunch being first wrapped up in soft paper), and covering every layer with bran, which should be well dried before it is used, laying a little of it in the bottom of the jar; then a layer of grapes, and so on, a layer of bran and of grapes alternately, till the jar is filled, then shaking it gently, and filling it to the top with bran, laying some paper over it, and covering the top with a bladder tied firmly on to exclude the air; when the top or cover of the jar should be put on, observing that it fits as close as possible, placing them in a room where a fire is kept in wet or damp weather."

Forcing of Vines.—This is performed in different sorts of buildings, contrived for the purpose; such as hot walls and vineries, as well as by hot-houses or stoves. See VINERY.

In the former cases, when the borders have been prepared and made up in the manner directed under the head Vinery; when proper plants of one or two years growth in pots cannot be procured, cuttings, Mr. Nicol says, should be made use of. Others, however, prefer cuttings in all cases, planting two in each hole, to guard against failure, the weakest, where both grow, being afterwards removed. These should be planted about the beginning of April, being chosen from good bearing vines, and such shoots as are well ripened, otherwise they never make good plants. The distance they should be allowed to remain is about six feet. In planting them out, holes should be opened with a spade, about eighteen inches deep; the cuttings being laid in the holes a little sloping, the earth being then filled into the holes, and gently pressed with the foot to them, and raised in a heap so as just to cover the uppermost eyes, afterwards applying a little mulch on the surface of the ground about them to prevent the sun and air from drying the earth; and when the spring is very dry, a little water should be given once a week.

Under this management they usually make strong shoots the first summer.

Mr. Nicol, where rooted plants are employed, advises the pits to be half filled with vegetable mould, and the plants to be carefully taken out of the pots with thin balls entire, and, unless when rooted, be placed in that manner in the pits, filling them in with vegetable mould, and settling them with a little water. This work, in his opinion, may be performed any time from the beginning of November to the first of March with equal success.

But though the above distance of planting may be proper when the vines are full grown, it may be beneficial to have them put in at half that distance at first; as a crop or two may be obtained before it is necessary to thin them out; two of a kind being placed together for the greater convenience of thinning.

The management of the vines, for the three first years after planting, is the same as practised for those against common walls, which has been described above, being, however, encouraged as much as possible, and the shoots not left too long, or too many in number on each root, that they may be duly ripened and prepared for bearing the fourth year, which is the soonest they should be forced: when any sorts of fruit-trees are forced by fire too young, they seldom continue long in health; so that what fruit they produce is small, and not well-flavoured.

By the middle of June the grapes will be almost full grown, therefore the glasses may be kept off continually in the day time, unless the season be very cold and wet, in which case they must be kept on, and only opened when the weather is favourable; for as the racy vinous flavour of these fruits is increased by a free air, so during the time of their ripening they should have as large a share as the season will admit to be given them.

Mr. Nicol advises "in the first and second seasons, to keep the border in a moderately moist state while the plants are growing; but, after their growth begins to abate, particularly the second season, to withhold the waterings by degrees till it is quite stopped, in order to make them harden and ripen their shoots for the production of a crop the third year. Water frequently with the drainings of a dunghill. And wash with the hand engine twice or thrice a week in the evening, in order to refresh and keep the plants clean. Steaming is, he thinks, unnecessary.

"In the third season, keep the border also in a moderately moist state, till the fruit begin their last swelling. Then give large quantities till they begin to colour; after which, entirely withhold it till the crop is gathered; and then give two or three hearty waterings, to recover the state the border ought to remain in for the winter."

He likewise advises "to wash twice or thrice a week till the flowers begin to open, then to withhold till the fruit is fairly set; washing again till they begin to colour, and then withhold entirely for the season. And in the interim of washing, to steam every night when the fire is at the strongest, by pouring water on the flues till you cannot see an object at the distance of two or three yards: and repeat this early in the morning, if the temperature of the house require the making of fires, or if there is a sufficient heat in the flues to produce it, even in a middling degree."

The insects which infest the grape house are chiefly the green fly, thrips, red spider, and wasp. The two first are, Mr. Nicol says, "easily destroyed by a fumigation of tobacco; the third is kept under by the engine in summer; and the last, by the destruction of their nests, phials filled with honey and water, or sugar and small beer, and bird-lime. All these methods are, however, sometimes ineffectual for the destruction of wasps where they abound in vast quantity; and their fondness for grapes renders it sometimes necessary to inclose the bunches in bags of gauze, or silken paper, which is a misfortune; as the grapes, by being so much excluded from the action of the sun and air, fall greatly off in flavour."

Birds must also be guarded against by some means or other; such as have been mentioned above.

All sorts of grapes should continue on the trees till fully ripe.

It is advised by some, that these vines should not be forced every year, but under good management every other year, or every third year. Of course, in order to have a supply of fruit annually, there should be a sufficient extent of walling to contain as many vines as are necessary for two or three years; and by having the frames in front moveable, they may be shifted from one part of the wall to another, as the vines are alternately forced. These hot-walls are commonly planted with early kinds of grapes, in order to have them forward in the season; though some think it hardly worth the trouble, in order to have a few grapes earlier by a month or six weeks, than those against common walls. The sorts of vines most useful in this mode of culture have been mentioned above.

After these vines are grown to full bearing, they must be pruned and managed after the same manner as has been directed for those against common walls, with this difference only, that in those seasons when they are not forced,

they should be carefully managed in the summer for a supply of good wood, against the time of their being forced, divesting them of their fruit for the purpose.

But when the vines are forced, the only care is to encourage the fruit, without having much regard to the wood, so that every shoot should be pruned for fruit, and none of them shortened for a supply of young wood, as they may be so managed by pruning in the years of their resting, as to replenish the vines with new wood. Those which are designed for forcing in the spring, should be pruned early in the autumn before, that the buds which are left on the shoots may receive all possible nourishment from the root, and at the same time the shoots should be fastened to the trellis in the order they are to lie; but the glasses should not be placed before the vines till about the middle or end of January, at which time also the fires must be lighted; for, if they are forced too early in the year, they will begin to shoot before the weather is warm enough to admit air to the vines, which causes the young shoots to draw out weak, and their joints too far asunder to afford a good and full supply of fruit.

When the fires are made at the above period, the vines begin to shoot the middle or latter end of February, which is six weeks earlier than they usually come out against the common walls; so that by the time that other vines are shooting, these will be in flower, which is early enough to ripen them. The fires should not be made very strong in these walls; as, if the air is heated to about ten degrees above the temperate point of the botanical thermometer, it will be sufficiently warm to force out the shoots leisurely, which is much better than to force them violently. These fires should not be continued all the day-time, unless the weather be very cold, and the sun does not shine to warm the air, at which times it will be proper to have small fires continued all the day; for, where the walls are rightly contrived, a moderate fire made every evening, and continued till ten or eleven o'clock at night, will heat the wall, and warm the inclosed air to a proper temperature; and as these fires need not be continued longer than about the end of April (unless the spring should prove very cold), the expense of fuel will not be very great, because they may be contrived to burn coal, wood, turf, or almost any other sort of fuel: though where coal is to be had reasonable, it makes the evenest and best fires, and will not require so much attendance. When the vines begin to shoot, they must be frequently looked over to fasten the new shoots to the trellis, and rub off all dangling shoots; in doing of which great care must be taken; for the shoots of these forced vines are very tender, and very subject to break when any violence is offered. The shoots should also be trained very regular, so as to lie as near as possible to the espalier, and at equal distances, that they may equally enjoy the benefit of the air and sun, which are absolutely necessary for the improvement of the fruit. When the grapes are formed, the shoots should be stopped at the second joint beyond the fruit, that the nourishment may not be drawn away from the fruit in useless shoots, which must be avoided as much as possible in these cases, no useless wood being left to shade the fruit, and exclude the air from it by the leaves.

In speaking of the temperature of the vinery, Mr. Nicol says, "fire should not be lighted the first season, unless it proves cold or wet, and the wood is not ripened in good time; in which case, a moderate fire heat, from the first of September, would greatly encourage the growth, and promote the ripening of the wood. And as the plants will bear gentle forcing the third season, it will be advisable (for that purpose) to forward them the second in a moderate degree. For this purpose, says he, let moderate fires be made about the first of April, (by which time the plants will begin to vegetate), so as to raise the air of the house at six in the morning and eight at night to about 55°; in the course of a fortnight increase it to 60°; and in another fortnight to 70°; at which let it continue till the first or middle of June, and then be totally discontinued for the season. But in the third season, the forcing may commence on the first of March, without injuring the plants; and, if carefully performed, a fair crop of fruit be obtained. Begin then by making and regulating the fires, so that the thermometer may not stand above 50 degrees at seven in the morning, and eight or nine at night; keep it so till every eye in the house is broken; and then gradually increase it to 60, 65, 70, and when the bloom begins to open, to 75 degrees. He has already hinted that vegetation in forcing ought to be brought on as it were by stealth; which is the cause of his advising the above gradual and progressive rise in the climate of the house; and where this is not particularly attended to in the first stage of the operation, disappointments will follow, as the plants will not break their eyes (and of consequence not show fruit) regularly." He advises to keep the air of the house as near to 75 degrees, till the fruit is fairly set, as possible, as grapes in general are found to set best in a moist heat of about 75 degrees. But he has found by experience that all the kinds of frontinacs require a much greater

degree of heat, not only when in flower, but from the time the clusters are distinguishable; while those of the white sweet water, and white and royal muscadines, require a much less degree; the former being apt to curl up and become steril for want of heat, and the latter to produce a greater quantity of small berries in consequence of too much. Therefore, where there is any difference of climate (which is sometimes occasioned by the placing of the fire-places) in the house, this hint should be taken advantage of. But it may then be let down to 70 or 72 degrees; at which endeavour to keep it till the crop is all gathered; after which, no further attention to the climate is necessary." It is added, "that in the following season, the forcing may, when requisite, be begun a month or six weeks sooner; as about the middle of January or first of February; in which early season great attention must be paid to the regulation of the fire-heat."

He observes, that "a month may be gained every season (where there are two or three grape-houses; and it is required to have grapes at a very early season), until you begin to force the first so early as the first of October; but where there is but one or two houses, the first of March in the one case, and of January in the other, is, he thinks, quite soon enough."

It is advised that "as the season advances and the weather becomes warm, there should be a proportionable share of free air admitted to the vines every day, which is absolutely necessary to promote the growth of the fruit; but the glasses should be shut close every night, unless in very hot weather, otherwise the cold dews in the night will retard it. The bunches in some of the sorts should be carefully looked over, and the small grapes cut out with very narrow-pointed scissars, in order to thin them."

Mr. Nicol recommends "a due portion of air to be admitted every day after planting, from sun-rise to sun-set, until the buds begin to break; after which, a more punctual regulation should be observed, being guided much by the temperature of the weather, and the quantity of sun-shine, but admitting less or more every day, unless the severity of frosty winds renders it imprudent to do so. And as the summer advances, to be very liberal in this article in serene weather; as it greatly tends to the strengthening of the young shoots." It is, he says, "a practice with many to uncover grape-houses in winter; this he never did, not so much disapproving of the practice, as owing to the expense attending it, not only in removing and putting on, but in breaking the glasses, and wasting the flues by the extremes of frost and blanching rains. His method is to admit an equal and free circulation of air, by opening the sashes alternately at top, bottom, and middle, to the extent of at least a third part of the whole covering, and letting them remain so day and night; never shutting up for any cause but that of too much wet. In the second season, much the same regulation should be observed as above; and, if fire is applied for the forwarding of the wood, due attention should be paid at that time, as the sudden breaking out of the sun in dull weather, when there is a good deal of fire heat in the house, is attended with much danger." Supposing the plants to have made good wood for the production of a crop, and that they are to be forced from the first of March, says he, "let the house be shut up at night from the middle of February, and have the same quantity of air in the day it enjoyed all winter." From the time the fire is lighted, give a moderate quantity every day if possible, till the buds have all broke, to the extent that in sun-shine the thermometer may not rise more than 10° above the fire-heat medium: but after the buds have broke, and the temperature of the house is increased, be careful in the admission of frosty, or foul damp air. The latter may be entirely excluded, except perhaps for an hour or two in the middle of the day; and the bad effects of the former, by opening the top sashes *only* a little way, to pass off the rarefied air occasioned by the sun heat, which is frequently very intense in clear frosty weather in the months of March and April. In clear sun-shining weather, his mode of practice is to give and take away air by degrees; that is, by giving half air about eight in the morning, full air about ten or eleven, reducing to half air about two or three, and shutting up about four or five in the afternoon, according to the season. It is necessary from the time the fruit begins to colour, to give large portions of air till the crop is all gathered, the flavour being much augmented by it; and afterwards to expose the house night and day for the winter, as directed above; shutting up, however, if much wet, or hard frost, should happen during the first ten or twelve days after the plants have been pruned for the winter season."

In the latter mode of forcing, or that in hot-houses or pine-stoves, after they have been properly prepared and rendered dry in the bottom parts, the area should be filled up with a compost-mould composed of one fourth strong loam; one fourth turf from a pasture where the soil is a sandy loam; one fourth sweepings or scrapings of pavements or hard roads; one eighth rotten cow and stable-yard dung mixed; and one eighth of vegetable mould from decayed oak leaves; the grass must be well rotted, and the whole worked

together till it is uniformly mixed. Where sandy loam cannot be had, common sand may be used; and the mould of rotten sticks or old woods, or from hollow trees, may be substituted for the decayed leaves.

"When the border has been prepared, if the weather permit, the vines may be planted at the end of February or the beginning of March, in the front of the hot-house or stove; having first taken the precaution to put a little moss round the upper part of each stem, with two or three folds of paper over it, tied with bass matting, to prevent the eyes from being injured in putting the plants through the holes in the wall. A hole two feet over, and one foot deep, should be made opposite to each rafter and close to the front wall, making the mould taken out of the holes fine, and adding a little of the compost. Then turn the plant carefully out of its pot, and put the upper part through the hole. If the shoot just reach the bottom of the rafter, when planted, it is sufficient; but as the earth may settle a little, it is better to allow two or three inches more. In closing the mould to the plant care should be taken to preserve the roots, their fibres being exceedingly brittle. Lay a thin coat of rotten dung over the mould, and give the plant a gentle watering; then take off the bandage, and fasten the top of the shoot to the rafter. Only one shoot should remain on each plant. Two may be left for a time; but when one is secure, the other must be taken off, but not close to the old wood, as that would occasion it to bleed, and greatly injure it."

It is observed that "from the time the vines begin to grow, they will require constant watering, especially in dry weather, and before the roots have penetrated sufficiently deep into the border or earth in which they are planted. It is the common practice, in these cases, to train a shoot up to each rafter; and if the rafters be not a sufficient depth to keep the leaves of the vines from touching the glass, to have iron pins of about nine inches in length, fixed at proper distances under each rafter; which should have a small hole or eye at the bottom, through which a small iron rod or strong wire should be thrust, for the support of the branch, which pins or wires should be painted."

Mr. Forsyth, however, remarks that when vines are trained straight up the rafters in this manner, they only throw out a few eyes at the top, the rest of the branch being naked; he therefore advises the serpentine method as much preferable.

The plants often show fruit at one year old, but it should not be suffered to stand, except a single bunch, to ascertain the sort. In the summer season the shoots should be constantly trained, keeping them regularly fastened to the rafters; divesting them of their wires and lateral shoots; and guarding them well against the red spider and other insects.

The vines may in general be suffered to run two-thirds of the length of the rafters before they are stopped; and those which grow remarkably strong, the whole length. When these shoots are stopped, which is done by pinching off their tops, they will, in general, push out laterals, at three or four eyes on the upper part of the shoot, which should be allowed to grow twelve or fourteen inches before their tops are pinched off; when these in their turn will push out other laterals, which should be pinched off at the second or third joint; and thus the sap may be diverted till the end of the season.

When the leaves begin to fall is the best season for pruning. In the first season, supposing the vines to have grown with equal vigour, the shoots may be pruned alternately to three, four, or five eyes, or about twenty feet; but when they have grown moderately strong, the shoots should be pruned down to about eleven feet; as by this alternate pruning the former shoots will make fine wood for the succeeding season, and the latter will produce a crop of fruit; after which, these fruit-bearing shoots must all be cut down nearly to the bottom of the rafters. But when any of the plants appear weak, and have not made shoots more than eight, ten, or twelve feet long, it will be proper to prune every shoot down to two, three, or four eyes. In performing the work the shoots should be taken off with a clean sloping stroke, about half an inch above the eye, making choice of a bold eye to terminate the shoot, and fastening it to the rafter in a complete manner.

The vines in pine-stoves begin to make weak shoots early in January; the house being then kept warm on account of early crops raised in most hot-houses. But when it is kept to a proper degree of heat for pines during the winter months, they seldom begin to push till about the middle of February. It is usual for them to push only towards the ends of the shoots, the other eyes remaining in a dormant state, and causing a long space of naked wood; but to make them push more generally, as soon as the sap is in motion, the house should be kept for a short time a few degrees warmer than usual. In the morning the thermometer should be 5° or 6° above temperate, and in the day-time the house be kept as warm as the weather will permit. It will also be necessary to guard the stem of the vine on the outside against frost; for one severe night would greatly injure, if not totally destroy, the hopes of a crop. This may be done by

wrapping the part exposed round with moss, fastened thick with bass matting; which covering should remain on till spring frosts are over, and then the stem be washed well to clean it. The vines should be divested of the least promising and supernumerary shoots as soon as possible, and great care should be taken not to leave too abundant a crop; as a few bunches in a high state of perfection are preferable to many in a poor state.

At the time of flowering, should the weather prove hot and dry, with brisk winds; to prevent the berries of different sorts from falling off at the time of their setting, it is proper to water the roots of the vines plentifully, to keep the house as close as the weather will permit, and to water the walks and flues in the hot-house constantly, especially late in the evening, when the glasses should be immediately closed, by which a beneficial sort of dew is produced.

In these situations, when the grapes are at their last swelling, are becoming transparent, and change from green to red or black, and till they are nearly on the point of being ripe, plentiful supplies of water, especially if the season prove hot and dry, should be given to the vines.

After the fruit is cut, no other management is required till the pruning season, but that of taking off the lateral shoots in the same manner as in the preceding case. But in the next winter's pruning all the vines that produced a full crop of fruit, should be cut down nearly to the bottom, that is, to the lowermost summer shoot, which should also be cut down to the first or second eye; while all those that were cut down nearly to the bottom the preceding season, and which will, in general, have made very strong wood, must be left to the length of twenty-one or twenty-two feet each, with the intention of producing a full crop of fruit the following season.

The management of them during the next summer will be nearly the same as in the preceding; only, as they have increased in strength and size, they will be enabled to produce and support a larger burthen of fruit. But the crop should always be proportioned to the size and vigour of the plants; but whilst they are young, great moderation should be used as to the number of bunches that are allowed to stand and ripen. They should be well thinned when the berries are about the size of a small shot. And the main shoulders, as also the less projecting parts of the bunch, should be suspended by small strings to the rafters, and every part raised to a horizontal position. In thinning the berries, great care should be taken to leave all the most projecting ones on every side of the bunch. In very close-growing bunches it will be necessary to clip out more than two-thirds of the berries; in some, one half; but in the loose-growing kinds, one third is generally sufficient. By this means the remaining berries will swell well, grow to a great size, and not be subject to rot; as they are apt to do in a hot-house, when they are wedged together in a close manner.

It is observed that "not only the rafters or roof of the hot-house, but the back wall also above the flue, may be furnished with fruit. For this purpose, let every fourth or fifth vine-plant be trained in one shoot quite to the top of the rafter, and then directed sideways ten or twelve feet along the top of the back wall. At the winter's pruning, bring down that part of the shoot perpendicularly, and cut it off at one foot above the top of the flue. The next spring encourage only two shoots from the two extreme or lowermost eyes of each shoot so brought down, and train them in a horizontal direction one foot above the top of the flue. These shoots, however, will grow with greater readiness, if they are trained upwards during the summer; and they may easily be brought to the desired position at the next winter's pruning. They will then form against the back wall the figure of the letter T inverted. And in the next season the horizontal shoots will produce new wood from almost every eye, provided all the shoots be pinched off from every other part as soon as they appear;" laying in the shoots from one to two feet apart, according to the kind of vine. It is advised in these cases, to "train all the shoots in a perpendicular direction, and, provided they are strong and vigorous, to suffer them to grow to the length of five or six feet before they are stopped; but all these must be cut down to two or three eyes at the next winter's pruning." And "only one shoot should be permitted to rise from each spur the following season; and although they will in general be sufficiently strong, and produce two or three bunches apiece, yet only one bunch should remain on each shoot: these will then be large and fine, and the wood will be greatly benefited by such practice. But these shoots must be pruned next winter very differently. One shoot must be left four feet, that next it only a few inches long, and so alternately." It is added that "the vines on the rafters will require a management in future seasons nearly similar to that described above; and though it may not be advisable to prune them alternately so near to the bottom of the rafters as was directed for the two preceding seasons, it will be frequently found necessary to cut an old shoot down to the lowermost summer shoot, as near to the bottom of

the rafter as can be. The side shoot on the other rafters should not be permitted to ramble over the adjoining lights; but at the end of every season it will be proper to cut such shoots down to the second or third eye next the old wood, provided the bottom eyes are bold and strong: this must be done not only to strengthen the vines, but also to prevent the roof of the house from being too much crowded with old wood. Whilst the vines are young, one rafter will suffice for a vine-plant; but when they become older, they will require a larger space; especially the strong-growing kinds, which produce large leaves and bunches. It will be proper therefore to train shoots sideways on the wall-plate, from the stem of the plant, immediately at its entrance into the house. These shoots should be carried up the adjoining rafters, and the plants growing against such rafters must be taken entirely away; except it should happen that the plant growing against such rafter is trained forward to furnish the back wall. And when a vine-plant occupies two or more rafters, it will be right to prune occasionally, particularly whilst the vine is young, one or more of such shoots down nearly to the bottom of the rafter, as this will not only contribute to strengthen the plant, but afford means to furnish the rafters with a succession of young wood." When the shoots are thus conducted to different rafters, every one may be considered as a separate plant, and be trained up in one shoot; requiring management similar to that mentioned above.

Mr. Nicol, however, rejects the method of planting the vines on the outsides of the houses, and his reasons are these: "first, he thinks it unnatural that one part of a plant should be as it were in Greenland, and the other in the West Indies; and secondly, because he is convinced that no plant (especially the Pine) will live and thrive as well under the shade of another, as when exposed to the free sun and air." To obviate these objections, he plants the vines in the lobbies between the stoves and peach and grape houses; introducing them through the partitions, and training them horizontally on trellises fixed against the back walls and upright sashes in front. By which means he renders each of the stoves as good as any grape-house, without being in the least injurious to the pines.

In these cases, he says, "the front walls of the lobbies were built on pillars; and a border, both without and within, prepared for the plants, in the same manner as for the grape-house." It is added, that in one trial, "the second year after introduction into the stove, the plants completely filled the whole trellis; and a fine crop, the third year, gave a lustre and richness to the house (in conjunction with a good crop of pines) highly gratifying."

He remarks that "the same methods in regard of watering, washing, and steaming, are to be practised here as in the grape-house. Air is admitted solely for the sake, and to answer the nature, of the pines; the temperature of the house is also regulated for their sakes. But the mode of training and pruning is very different from that in the grape-house. Here, you have it not in your power to bring on vegetation in that slow and regular manner as in the grape-house; and consequently, were the shoots to be laid in at as great lengths, they would only break perhaps a few eyes at the extremities, and the rest remain naked. This he found from experience to be the case; although it did not happen for the first three or four years, owing to the youth and vigour of the plants: but when they had exhausted themselves a little by bearing a few crops, they began to break their buds in the manner above stated. He therefore made it a practice to train them only to five or six feet in summer, and shorten them down to one or two in the pruning season; by which they generally broke all their eyes, and produced plenty of fruit." He further states, that in one house he tried, for two seasons, to produce crops by laterals; but found that method attended with more inconveniency than the above, from the difficulty of procuring a proper succession of strong shoots to produce the laterals, without which they bear very insignificant clusters. He also, in the other house, produced a second crop, for two seasons; but finding it to exhaust the plants very much, he discontinued it; the more especially, as, having so many compartments for grapes, the practice of it was the less necessary. The method is, he says, this: "Just about the time the fruit is half ripe, and when the under part of the shoot is also ripe to the length of about two or three feet, and the extremity of it in a growing state, shorten it at about two or three feet above the ripe part. It will push again, and will generally bring two clusters. Sometimes, also, the second and third eye will push, and bring a cluster or two. In winter pruning, shorten down the first, or spring-made part of the shoot, to two or three feet. This method may be repeated, he thinks, with pretty good success once in two or three years: but, if done every year, it will (in the course of three or four years) occasion the cutting of the plants down to the ground, in order to make them put forth a fresh stock of wood."

He adds that "in the event of severe frost, and the plants being in an early state of vegetation, the border on the outside should be co-

vered with a quantity of stable dung, or long litter, to prevent the roots from being injured by the weather. And unless the plants are wished to produce a second crop, they must not be pruned for good sooner than October; and at the same time, that operation should not be deferred longer than the first of November, lest, when they begin to vegetate, they should bleed. He concludes by observing, that grape vines will bear forcing, and last for many years, when under judicious management."

Besides these modes of cultivating vines, they are capable of being grown with advantages under hand-glasses, so as to produce a few bunches on each plant.

The second species requires artificial heat in this climate, and may be increased from seeds, obtained from abroad, which should be sown in small pots, and be plunged into a hot-bed of tanner's bark. When the plants come up and are fit to remove, they should be each planted out into a separate small pot filled with light earth, and plunged into a fresh hot-bed, shading them from the sun till they have taken new root; when they must be treated in the same way as other tender exotic plants, always continuing them in the stove, otherwise they will not succeed well.

The third should be planted against a wall, and treated in the same way as the common vine, being raised by cuttings or layers in the same manner.

The fourth sort is preserved in some gardens for variety; but it rarely produces flowers in this climate, and has not much beauty. It is increased by laying down the young branches in the spring, which mostly put out roots in one year fit to remove, when they may be taken off and planted out where they are to remain. These require support; and as their young branches are tender, and liable to be killed by frost, they should be planted against a wall, or pale, exposed to the south. The young shoots should be shortened down to two or three buds in the spring, which will cause the shoots of the following summer to be much stronger.

VOLKAMERIA, a genus furnishing plants of the exotic tree kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a one-leafed perianth, turbinate, five-cleft, nearly equal, acute: the corolla monopetalous, ringent: tube cylindric, twice as long as the calyx: border five-parted, nearly equal, flat: segments reflexed to one side, gaping chiefly on the upper side: the stamina have four filiform filaments, very long, on the gaping side of the corolla: anthers simple: the pistillum is a four-cornered germ: style filiform, length of the stamens: stigma bifid: one of the segments acute, the other indistinct: the pericarpium is a berry (drupe) roundish two-celled, four-grooved: the seed, nut solitary, two-celled, grooved.

The species cultivated are: 1. *V. aculeata*, Prickly Volkameria: 2. *V. inermis*, Ovate-leaved Smooth Volkameria.

The first is a shrub five or six feet high, branched, upright, the whole loaded with white flowers, which have no scent: the stamens most commonly five, but sometimes six, purple: the fruit brown. It is a native of the West Indies.

The second species has the leaves opposite, annual, petioled, bluntish: the peduncles from the upper axils, opposite, solitary, a little shorter than the leaf, three-cleft, three-flowered, more seldom simple and one-flowered: it rises higher than the first sort: the stem and branches are stronger, and grow more erect: the bark is very white: the leaves frequently grow round the branches in clusters or whorls: flowers on long axillary peduncles, supporting several flowers which generally stand erect. It is a native of the East Indies.

Culture.—These plants are increased by cuttings, which should be planted in pots filled with light good mould, in the summer season, plunging them in a moderate hot-bed, covering them close with hand glasses: when they are well rooted, they should be removed into separate small pots, replunging them in the hot-bed till they are fresh rooted; then gradually inure them to the open air in warm weather, continuing them in warm sheltered situations in the open air, till the approach of frosts, when they must be taken into the house where there is a moderate heat. They will not succeed in a common green-house.

They afford ornament among other more hardy stove plants.

WACHENDORFIA, a genus furnishing plants of the exotic flowering perennial kind, for the green-house.

It belongs to the class and order *Triandria Monogynia*, and ranks in the natural order of *Ensatæ*.

The characters are: that the calyx is a two-valved spathe: the corolla six-petalled, unequal: petals oblong, the three upper ones more erect, three lower spreading: nectary of two bristles at the inner sides of the upper petal: the stamina has three filiform filaments, declined, shorter than the corolla: anthers incumbent: the pistillum is a superior germ, roundish, three-cornered: style filiform, declined: stigma simple: the pericarpium is a subovate capsule, three-sided, obtuse, three-celled, three-valved: seeds solitary, rough-haired.

The species cultivated are: 1. *W. thyrsiflora*, Simple-stalked Wachendorfia: 2. *W. paniculata*, Panicled Wachendorfia: 3. *W. hirsuta*, Hairy Wachendorfia.

The first has a thick tuberous root, reed-like, of a deep-red colour, sending out many perpendicular fibres of the same colour, and spreading into several offsets: the leaves, which rise immediately from the root, are large, with five plaited folds; the biggest are two feet long, and three inches broad, of a deep green-colour: the flower-stalk rises from the centre of the heads between the leaves to the height of three or four feet, with leaves of the same form with those below, but narrower, and ranged alternately, embracing the stalk half round with their base: the flowers when young are enclosed in sheaths, which, after some time, open and make way for the flowers to come out; then they wither and dry, but remain upon the stalk like those of the yellow Asphodel: they form a loose spike, and there are several upon one common peduncle, which open one after the other: the upper flowers stand almost upright, but the lower nod; they are hairy and of a saffron colour on the outside, but smooth and yellow within. It is a native of the Cape.

The second species, when in flower, is a foot high: the root perennial, a little creeping, furnished with oblong cylindrical and nearly perpendicular tubercles: the leaves radical, two-ranked, sessile, equitant, vertical, spreading, dilated on the inner side at the base, channelled, linear-lanceolate, pointed, entire, nerved, bright green, very like those of the first, but only one-third of the size, dying soon after the plant has done flowering, and not appearing again for some months: the stalk erect, cylindrical, bearing one or two small leaves, branched, many-flowered: general flower-stalks alternate, spreading, racemose, bearing from three to five flowers, cylindrical, downy: partial ones short, downy, all directed upwards, single-flowered. It is a native of the Cape.

The third seems chiefly to differ from the second in having hairy leaves, a more slender and taller stem, reddish-brown, and not green as in it; its branches more divaricate, the two upper lateral petals more contiguous, and its flowers when closed form a slenderer and more compact column: the incumbent anthers seem also to be shorter and rounder: the root-leaves oblong, lanceolate, three or four, about three or four inches high: the stem about three times their length: the segments traversed longitudinally on the outside by a brown hairy fillet; outer upper one wholly brown and pubescent outwards: the flowers scentless, opening in succession, closing towards evening: they expand in the month of July. It is a native of the Cape.

Culture.—These plants may be increased by offsets, taken from the heads of the roots, in the beginning of autumn, planting them in pots filled with soft loamy earth, mixed with a little sea sand, and when the season proves dry, placing them so as to have only the morning sun, until the offsets have taken new roots, when they must be placed in a sheltered situation, of as to have the full sun. On the approach so frosts, they should be placed in frames, and managed as plants of the tender kind.

The second sort is very impatient of cold, and seldom flowers in this climate.

They produce variety among other potted plants of the green-house kind.

WALK, a dry firm track in the garden or pleasure ground, which is formed of different sorts of materials; as gravel, sand, &c.; but where these cannot be procured, it is sometimes laid with powdered coal, sea-coal ashes, and powdered brick: these are, however, rarely used, when either gravel or sand can be procured. Where sea-coal ashes can be had,

Painted by Syd. Edwards London Published May 1.1827 by G. Kearsley Fleet Street Engraved by F. Santon

1 *Wachendorfia Paniculata*
Panicled Wachendorfia

2 *Vitex Negunda*
Five leaved Chaste Tree

they are preferable to powdered coal or bricks, as they bind very hard, and never stick to the feet in frosty weather. And for wilderness walks they are before most other substances. There are likewise walks sometimes formed of turf, or what are called grass walks. In forming the first sort of walks, when they have been marked out, the earth should be taken away to a certain depth, that the bottoms may be filled with lime rubbish, coarse gravel, flint-stones, or other rocky materials, to prevent weeds from growing through the gravel, as well as to keep away worm-casts. It should be laid ten inches or a foot thick, over which the coat of gravel should be six or eight inches, which should be very fine, but not screened, the large stones only being taken out. When the gravel has been laid to this thickness, they must be exactly levelled, and raked true from all great drips, as well as little holes: by this means most of the stones will be raked under the feet, which may either be evenly sprinkled back over the last length that is raked, or buried in the bottom. Walks are frequently laid too round, so as scarcely to be walked upon with pleasure, and so as to lessen the effect of their breadths. The usual allowance for a gravel walk of five feet breadth, is about an inch rise in the crown: consequently, if twenty feet wide, it will be four inches higher in the middle than on each side; and for twenty-five feet, five inches, for thirty feet, six inches, and so on in the same proportion. When the walk has been carefully laid, trodden down, and raked, either in lengths, or the whole together, it should be rolled well, both in length and cross-ways; the person who rolls wearing shoes with flat heels, that he may not make holes; as, when these are once made in a new walk, they are not easy to roll out again. In order to lay them firm, it will be necessary to give them three or four rollings, after good waterings or heavy rains, as this will cause the gravel to bind, so that when they become dry they will be as hard as terrace. Iron-mould gravel is said to be best for binding, or such as has a little binding loam amongst it; which latter, though it be apt to stick to the heels of shoes in wet weather, nothing binds better in dry weather; and when the gravel is over-sandy or sharp, clay is frequently mixed with it, which, when cast together in heaps and well mixed, binds like a rock: loose gravel is very uncomfortable and uneasy to walk on.

Walks of this sort are not only necessary near the house; but one should always be carried quite round the garden, as being soon dry after rain, and proper for walking on in all seasons. See GARDEN PLAN.

Those about the house should be large, and laid out according to the nature and situation of the ground.

The walks laid with sand or other materials, in the other different parts of gardens or pleasure grounds, should be formed in the same manner, having regard to the nature of the soil, so as to render them as dry as possible at all seasons. The breadth in these walks should be in some measure according to the nature of the ground. Where this is small, five or six feet may be sufficient; but in large grounds much wider, as ten or twelve. In modern grounds of this sort, they are mostly laid out in winding serpentine directions, according to the nature of the sites, so as to have them concealed, and rendered as private as possible, by the trees and plants on their sides; the turns being contrived in as easy and natural a way as can be effected. See GRAVEL.

WALL, a sort of fence erection in gardens, built for the purpose of ripening all such fruits as are too delicate to be perfected in this climate without such assistance. Walls are built with different materials, as stone, brick, &c., according as they can be best procured, and at the cheapest rate. But for fruit-trees, brick is the best, as being not only the handsomest, but the warmest and kindest for the ripening of fruit, as well as affording the best convenience of nailing, for smaller nails will serve in them than in stone walls, where the joints are larger; and brick walls, with copings of free-stone, and stone pilasters or columns, at proper distances, to separate the trees and break off the force of the winds, make not only the most beautiful but the most profitable walls that can be erected.

Sometimes walls are built of mixed materials, as stones and bricks; but in this way they should be carefully built, or the brick front will separate from the stone behind.

Where walls are built entirely of stone, there should be trellises fixed up against them, for the more convenient fastening the branches of the trees: the timbers of these espaliers need not be more than an inch and a half thick, and about two inches and a half broad: these should be fixed across each other, at about four inches distance; for, if they are at a much greater distance, it will be difficult to fasten the shoots of the trees properly. As this trellis will be laid close to the wall, the branches of the trees will lie about two inches from the wall, in which position the fruit ripens better than when it lies quite close to the wall.

Many improvements have been attempted in building walls in different forms, as in semicir-

cular methods, in angles of various forms, and projecting more towards the north, to screen off the cold winds; but not any method has yet been found which succeeds so well as that of making them straight, and building them in an upright manner.

Other schemes of expediting the ripening of fruits on walls have been tried, such as painting them black, or of a dark colour, as the dark colour is supposed to imbibe more of the sun's rays, and retain the warmth longer. This has, however, on the same principle, answered better in theory than practice.

Walls, where substantially built, answer much better than those which are slight, not only in their duration, but also in their warmth. A wall two bricks thick will be found to answer better than one brick and a half; and if in the building of garden walls they are grouted with soft mortar, to fill and close all the joints, the walls will be much stronger, and the air not so easily penetrate through them, as it does through those which are built in the usual manner.

In respect to the aspect for walls in this climate, those which have one point to the eastward of the south are the best, as they enjoy the benefit of the morning sun more, and are less exposed to the west and south-west winds, which are very injurious to fruits, than those which are built due south.

And the next best aspect is due south, and after that the south-east. But as there will, for the most part, be south-west and west walls, these may be planted with some sorts of fruit which do not require so much heat to ripen them as those designed for the best walls: but wherever there are north walls, those will only be proper for baking pears, plums, and morello cherries, for preserving: or duke cherries may be planted against these walls, to continue them longer in the season.

The usual thickness of building walls with brick is thirteen inches, or a brick and a half; but this should be proportionable to the height: for, if they are built twelve or fourteen feet high or more, as is often practised, then the foundations of the walls should be at least two bricks and a half in thickness, and brought up a foot or more above the level of the surface of the ground, of the same thickness; then be set off two inches on each side, which reduces them to two bricks; and five or six feet above the surface of the ground they may be diminished on each side, to reduce them to the thickness of a brick and a half; which must be continued to the top. The piers in these high walls should also be proportionably stronger than is commonly allowed to lower walls; for, as being more exposed to strong gales of wind, if they are not well built, they are in danger of being blown down. The piers in these cases should be projected the length of a brick in the backside, and the thickness of a brick in the front, and be built about ten or twelve feet asunder.

There is, however, no necessity for building walls higher than nine or ten feet, unless for pears.

In building of hot-walls, the ordinary height is usually about ten feet, which is sufficient for any of those sorts of fruits which are generally forced; for, by forcing the trees, they are mostly weakened in their growth, so that they do not grow so vigorously as those which are exposed to the open air; and where there is not a quantity of walling planted sufficient to let one part rest every other year, the trees are never very healthy, and last but a few years. In these walls the foundations should be made four bricks and a half thick, in order to support the flues; otherwise, if part of them rest on brick-work, and the other part on the ground, they will settle unequally, and soon be out of order; for, wherever there happen any cracks in the flues, through which the smoke can make its escape, it will prevent their drawing; and if the smoke gets within the glasses, it will greatly injure the fruit, and give it a smoky taste. This thickness of wall need not be continued more than six inches above the ground, where the foundation or bottom of the first flue should be, which will be sufficient to raise it above the damps of the earth: then the wall may be set off four inches on each side, which will reduce it to the thickness of three bricks and a half, so that the back wall may be two bricks thick, which is absolutely necessary to throw the heat out more in front; for, when the back walls are built too thin, the heat escapes through them. The wall in front next to the fruit should be only four inches thick, whereby there will be an allowance of nine inches for the flues, which may be covered with twelve-inch tiles; for, if they have an inch and a half bearing on each side, it will be sufficient. The places in which the fires are made must be contrived on the backside of the walls, which should be in number proportionable to the length of the walls. The length usually allowed for each fire to warm is forty feet, though they do very well for fifty feet: they should be shedded over with brick and tile, to keep out the wind and rain, otherwise the fires will not burn equally; and as it is quite necessary to have the fire-places or ovens below the foundation of the first flues, there must be steps down into the sheds, to come to the mouth of them to supply

the fuel; of course they should not be narrower than eight feet in the clear. Where the length of walling requires two ovens, they may be in the middle, being included in one shed, which will save expense, and allow more room to attend the fires; as in this case the sheds must be at least ten feet long, but not more than six in breadth; the steps down being at one end.

In regard to the lower flue through which the smoke first passes from the fire, it may be two feet and a half deep; of course the back wall should be at least two bricks and a half thick, as high as to the top of this flue; and then it may be set off to two bricks, which must be continued to the top of the wall. The second flue, which should return over the first, may be made two feet, the third a foot and a half, and the fourth one foot deep; which four flues, with their coverings, will rise near eight feet in height, so that there will be about two feet left for fixing of the frames at the top to support the glasses, and for the coping of the wall; these four returns will be sufficient to warm the air in the frames. But in the carrying up these walls, some strong iron hooks should be well fastened at convenient distances projecting about two inches from the wall, to which the trellis must be fastened which is to support the trees. The flues must be well pargeted with loam on their inside, and loam be spread under the tiles which cover them, to the thickness of the hooks, that the flues may be very smooth. At each end of these flues small arches should be turned in the back walls, in such a manner that there may be holes opening to clean the flues of soot whenever there is a necessity for it. With respect to the borders in front of these walls, they should be about four feet wide, which will make a sufficient declivity for the sloping glasses; and on the outside of them should be low walls, rising four or six inches above the level of the borders, upon which the plate of timber must be laid, on which the sloping glasses are to rest. The glasses must be divided into two ranges, being contrived in such a manner, as that the upper row may slide down, and be fastened at suitable distances, but the lower may be either fixed or moveable; and the sloping timbers which support the glass frames, must be fastened at bottom into the ground-plate in the front of the border, and at the top into strong iron cramps, fixed in the upper part of the wall for the purpose. They are best made of fir, which does not twist, as oak and some other wood, where it is laid in such position; and on the top should be fixed, in a close manner, a strong board, under which the upper row of glasses should slide, in order to secure the upper part of the glasses from being raised by the winds, and keep the wet from the trees. It may project on to the glasses about two inches. The width of the frames may be about three feet, or according to the extent of the wall, the bars being placed lengthways of them. See HOT-WALL.

WALL TREES, such fruit-trees as are planted against walls, and have their branches trained to them in a fanned regular manner, from three or four to five or six inches asunder, in order to produce their fruits in a superior degree of perfection. They are trees of the more tender kinds, or such as will not ripen their fruits in this climate, unless trained against walls of a southerly aspect, to have the advantage of the full sun; and several sorts of the hardier kinds, to obtain their fruits in earlier maturity, and of an improved growth and flavour. The trees must be trained to south walls for the principal sorts of the more delicate or tenderer kinds, such as peaches, nectarines, apricots, grapes, figs, &c., to have the benefit of the full sun, as they do not ripen in good perfection without this assistance. Some of the best varieties of the principal sorts of the hardier fruit-trees, as the most esteemed cherries, plums, and pears, should be also trained to these walls to produce early fruit in the greatest perfection; also some trees of the choicer sorts of summer and autumn apples, to have the fruit earlier, and of an improved rich flavour for immediate eating; likewise some of the best red and white currants and gooseberries: and on west and east walls to have trees of most of these sorts, to ripen in good perfection, in succession to those on the south walls, especially cherries, plums, and pears, and occasionally some common peaches, nectarines, and apricots; but vines and figs generally on south walls, especially vines, which require all possible benefit of the full sun to ripen the grapes in proper season, and with a rich flavour: the north walls are eligible for any of the common hardier summer and autumn fruits, as cherries, particularly morellos, plums, and pears, for late ripening, to succeed those of the more sunny exposures, and to continue a longer succession of particular sorts, which ripen for immediate eating from the trees; also white and red currants for successional ripening in the autumn. Trees of this sort may be considered as of two orders; common dwarf wall-trees and half-standard wall-trees. See STANDARD TREES and TRAINED TREES.

The proper season for planting wall-trees is either in autumn, as in October, November, &c., or in spring, as February and March, or not later than the beginning of April, but before that time, if possible; as late spring-planting.

after the young trees begin to push their shoot-buds, is often attended with bad success.

The soil for wall-trees should be a good dry mellow garden earth, not less than one full spade deep; but if two or more, it will be advantageous: or where a good moderately light loamy soil prevails, it is superior for most sorts of fruit-trees; and when enriched by good garden compost it is still more beneficial.

The most proper aspects for the different kinds are as above; and the methods of planting, training, pruning, and nailing, of the different sorts are explained under their particular culture, in the several heads.

WALL-FLOWER. See CHEIRANTHUS.

WALL-PEPPER. See SEDUM.

WALNUT TREE. See JUGLANS.

WALTHERIA, a genus affording plants of the woody exotic kind.

It belongs to the class and order *Monadelphia Pentandria*, and ranks in the natural order of *Columniferæ*.

The characters are: that the calyx is a perianth (double: outer one-sided, three-leaved, deciduous; cav. inner) one-leafed, half-five-cleft, acute, cup-shaped, permanent: the corolla has five petals, obcordate, spreading, fastened at bottom to the tube of filaments: the stamina have five filaments, united into a tube, free above, spreading, short: anthers ovate: the pistillum is an ovate germ: style filiform, longer than the stamens: stigmas pencilled: the pericarpium is an obovate capsule, one-celled, two-valved: the seed one, obtuse, wider above.

The species cultivated are: 1. *W. Americana*, American Waltheria: 2. *W. Indica*, Indian Waltheria: 3. *W. angustifolia*, Narrow-leaved Waltheria.

The first has a soft, woody stem, about two feet high, sending out two or thee side branches: the leaves alternate, of a pale yellowish green colour, soft and hairy: the flowers collected in a close thick spike at the top of the stem, having soft hairy calyxes: the petals connected at their base, small, bright yellow, spreading. It is a native of South America, &c.

The second species rises with a shrubby branching stalk to the height of eight or ten feet, and is covered with soft hairs: the leaves alternate, petioled, four inches long, and two inches broad in the middle, rounded at both ends, of a yellowish green colour, very hairy and soft, having several longitudinal veins: the heads axillary, sessile, composed of clusters of very small yellow flowers, which just peep out of their soft yellow calyxes. It is a native of India.

The third has woody stalks, six or seven feet high, dividing into several branches, which are less hairy than those of the second sort: the leaves about three inches and a half long, and an inch and half broad, of a yellowish green colour, not so soft as those of the second, having many veins running from the midrib, standing upon very long footstalks: the flowers very small, yellow, collected into round clusters, standing upon very short peduncles, close to the axils. They appear in June, July, and August. It is a native of the East Indies.

Culture.—These plants may be increased by seeds, which must be sown on a hot-bed; and when the plants are fit to plant out, they must be each removed into a separate small pot, and plunged into a fresh hot-bed, being afterward treated in the same manner as other tender plants of the same nature, being kept in the bark-stove. In the second year they flower and produce seeds, but may be continued three or four years if they be often shifted, and the roots pared to keep them within compass. In the view of keeping the roots out of the tan, they should be drawn up out of it at least once in six weeks, during the summer season, and the plants be shifted out of the pots once in two months: with this management the second and third sorts may be continued several years, but the first seldom endures longer than two.

They have a good effect in stove collections.

WART-WORT. See EUPHORBIA.

WATER, a well known useful article in gardening, for watering numerous sorts of young plants and trees, seed-beds, &c., especially in the droughty spring and summer seasons, both such as grow in the full ground, and in pots in the open air, as well as those in green-houses, stoves, hot-beds, &c.: and also in ornamental designs, in pleasure grounds, parks, &c., either when formed into regular pieces, circular, oval, or in oblong or serpentine canals, &c., likewise when varied in a somewhat natural expanse in curves and bendings.

In forming designs of this sort, the nature of the supply should be first considered, whether it be by springs in or near the place, by currents or streams passing through, or so nearly adjacent as to admit of being conducted to the place: or by being conducted from some neighbouring river, brook, or lake, &c., by means of pipes or small cuts, or by being collected issuing from higher grounds, and conducted by proper channels. And another circumstance equally necessary is to consider the means by which it may be retained afterwards. In a loose earthy, sandy, or gravelly bottom, it will soon sink away, especially in dry weather, unless there is a constant current or flow of water running in; but in a naturally strong clayey bottom

of proper thickness both at sides and below, it may be retained in some tolerable degree.

In most cases art, however, will be necessary in this business. See Basons, &c.

Where it is easily attainable in any of the above modes, it should not be omitted, in a smaller or larger scale, especially in grounds of any considerable extent; but where intended principally as reservoirs for watering gardens, they may be of much more moderate dimensions than when designed for ornament; and may be formed either in a circular manner, an oblong canal, pond, or cut, &c.; where the supply of water can be most conveniently procured.

Ornamental plats or pieces of water in pleasure-grounds are very desirable, as being great additions to the beauty, variety, and embellishment of them, when properly disposed, and contrasted with some nearly-adjoining detached clumps of plantation, and bounded with a proper expanse of grass ground, spreading from the verge considerably outwards.

In general, when any spaces of water, on a larger or smaller scale, are intended, they should be disposed as conspicuously as possible in some principal division; either sometimes at or near the termination of a spacious open lawn, or occasionally in some other similar open space; and sometimes disposed more or less internally in some central or other grand opening; in all of which, an expanse of water has a fine effect.

The particular forms may be adapted to the nature of the situation, and the extent to that fo the supply of water that can be had.

Cascades or waterfalls are also occasionally introduced in extensive pleasure-grounds where there is the advantage of a rivulet, by which they may be formed either in one large fall, or in two or three smaller ones in succession, having large rough stones placed below to break the water, and increase the sound of the torrent in its fall and passage over them, in some degree similar to that peculiar to natural cascades. And fountains, spouting water from images, &c. are sometimes introduced in the centre of small or moderate basons, or other reservoirs of water in gardens, or grounds where a supplying head of water is conveniently situated sufficiently high to raise and throw the water from the jet or spout in a continued full stream to a considerable height, which falling in the bason, keeps the water of it in motion, prevents stagnation, and is thereby rendered more proper for keeping and breeding fish of the gold and silver kinds, &c. and the spouting and falling of the water has a refreshing effect in the heat of summer.

In the business of forming the ground for water, the earth must be excavated to a proper depth, gradually sloping from the verge to the middle, from three to four or five feet deep; sometimes, however, in low situations, the place is naturally hollowed in some degree, so as not to require a general excavation, or only in particular parts, and some general regulations to the whole, which in extensive designs is a considerable advantage. Where the sides and bottom are of a sandy, gravelly, or stony nature, or abound in loose soil, and there is not a constant supplying stream, they must be well secured by the application of a thick coat of well-wrought clay. And where this claying is necessary, in the preparatory excavation, a proper allowance should be made for the additional coat of clay, to the extent of twelve or fifteen inches in thickness, and of several inches of gravel over it, to preserve the clay from being wasted by the motion of the water, and keep it clear, which would otherwise be muddy. But previous to the claying, the loose and uneven parts in the bottom and sides of the cavity should be well rammed, to make the whole firm, even, and smooth; then beginning in the middle space with the clay, and proceeding gradually outward, being careful that no stones, sticks, or other matter, get mixed with it, to occasion fissures or cracks, by which the water may escape, laying it evenly, a small thickness at a time, and spreading it regularly, treading it well with the naked feet; and if dry weather casting water on it occasionally, ramming it well from time to time with wooden rammers; then gradually applying more clay, in the same manner, to the proper thickness, being careful that every part is so well puddled and rammed, as not to leave the smallest vacancy. Thus continuing the claying in a regular manner each way from bottom to the top of the circumference, smoothing the surface evenly, and in dry weather covering it, as the work proceeds, with mats or straw litter, or with the stratum of pebbly gravel. When the whole is finished, the water should be let in.

When this has been done, the top or verge must be regulated and levelled, forming it evenly from the edge of the water in a gradual regular expansion to some extent outward, without any stiff slope close to the water, distinct from the surrounding superficies; laying the ground with grass turf, especially along the margin, continuing it as far down as the general level of the water. Where the extent is considerable, it may be sown with grass seeds.

WATER CRESS. See Sisymbrium.

WATER LILY. See Nymphæa.

WATER MELON. See Cucurbita Citrullus.

WHIN. See ULEX.
WHIN, PETTY. See GENISTA.
WHITE BEAM. See CRATÆGUS.
WHITE LEAF. See CRATÆGUS.
WHITE THORN. See CRATÆGUS.
WIDOW-WAIL. See CNEORUM.
WILD OLIVE. See ELÆAGNUS.
WILLOW. See SALIX.
WILLOW, SWEET. See MYRICA.

WINTERA, a genus containing a plant of the exotic tree kind.

It belongs to the class and order *Dodecandria Monogynia*, and ranks in the natural order of *Magnoliæ*.

The characters are: that the calyx is bell-shaped, tri-lobed, with the lobes roundish and concave: the corolla has five oblong, sessile petals, longer than the calyx, and a conical, pitcher-shaped nectarium: the stamina have no filaments; but twelve or sixteen linear, distant antheræ, affixed to the outside of the nectarium: the pistillum is an oval germ, cylindric style, with three obtuse stigmas: the pericarpium is a roundish, trilocular berry, with two heart-shaped seeds.

The species is *W. Canella*, Wintera, or Bastard Cinnamon.

It rises with a thick woody stem, branching on every side, almost the whole length, growing near twenty feet in height, having a lightish-coloured aromatic bark: the leaves are oblong, obtuse, light-green: the flowers red, in umbellate clusters, at the ends of the branches, succeeded by roundish berries. It is a native of South America.

Culture.—This may be increased by planting cuttings of the shoots in pots filled with mellow loamy mould, plunging them in the bark-bed of the stove. When the plants have attained a good root, they may be removed into separate pots, replunging them in the bark-bed, giving shade and a little water till fresh rooted; being afterwards managed as other woody stove plants. It must always be kept in the stove.

This plant affords variety in the stove among other aromatics.

WINTER-BERRY. See PRINOS.
WOODBINE. See LONICERA.
WOOD, WAXEN. See GENISTA.
WORMWOOD TREE. See ARTEMISIA.

XERANTHEMUM, a genus containing plants of the herbaceous, flowering, annual and shrubby kinds.

It belongs to the class and order *Syngenesia Polygamia Superflua*.

The characters are: that the calyx is a compound flower, having the general calyx composed of many long spear-shaped scales: the corolla is composed of many hermaphrodite florets in the disk, each consisting of one funnel-shaped petal, five-parted at top; and tubular female florets in the radius, more slightly cut at the brim: the stamina five very short filaments, and long cylindric antheræ: the pistillum is a short germen, filiform style, having a bifid stigma in the hermaphrodites; and in the females two reflexed stigmas: there is no pericarpium; each floret succeeded by an oblong, coronated seed, placed on a chaffy receptacle.

The species cultivated are: 1. *X. annuum*, Annual Xeranthemum, or Common Eternal Flower; 2. *X. retortum*, Reflexed-leaved Eternal Flower; 3. *X. speciosissimum*, Golden Eternal Flower; 4. *X. Sesamoides*, Silvery Eternal Flower; 5. *X. proliferum*, Proliferous Eternal Flower; 6. *X. vestitum*, Leafy-flowered Eternal Flower; 7. *X. imbricatum*, Imbricated Eternal Flower.

The first rises with an herbaceous, angular, downy, branching stalk, to the height of two or three feet: the leaves are spear-shaped, spreading, hoary, close-sitting; and all the stalks and branches terminated by large flowers singly, of different colours in the varieties, appearing from July to September, and succeeded by ripe seeds in autumn. It is a native of the Cape.

There are varieties with large white flowers, with purple flowers, with double white flowers, with double purple flowers, and with double violet-coloured flowers.

The second species has under-shrubby trailing stalks, set with recurved, reflexed, hoary-silvery leaves: the flowers come out at the axillas of the branches, having white rays and yellow disks. It is a native of Africa.

The third has an upright shrubby stem, branching three or four feet in height, being set with spear-shaped, trinervous, sessile leaves; and at the termination of the branches large bright golden-yellow flowers. It is a native of the Cape.

The fourth species has also an upright shrubby

stem, with slender hoary branches, rising three or four feet in height: the leaves small, linear, adpressed, laid close to the branches; and the branches are terminated with large silvery white flowers. This plant is also a native of the Cape.

The fifth has shrubby proliferous stalks: the leaves are granulous-roundish, lightly imbricated: the flowers sitting close to the branches.

The sixth species rises with an upright shrubby stem, branching three or four feet in height: the leaves are linear spear-shaped, mucronated: and the flowers are terminal, leafy, white. It is a native of Africa.

The seventh has the stalks shrubby; and the leaves oval-awl-shaped, smooth, imbricated: the flowers at the end of the branches.

These plants have the name of Eternal Flower, from the circumstance of their continuing long after being plucked.

Culture.—In the first sort and varieties the culture is readily effected by sowing the seeds in pots of light fresh mould in the autumn or spring, or at other seasons for a succession, plunging them in a moderate hot-bed, to bring forward the plants. In the spring they may also be sown in patches where they are to remain, or in beds to be afterwards removed. When the plants have a few inches growth, they should be pricked out in rows a foot apart on beds, or into the borders, clumps, or other places where they are to grow. They should afterwards be kept clean from weeds, and have occasional waterings immediately after pricking out, and afterwards in dry weather.

The other sorts are raised by planting cuttings of the young shoots in the summer in pots filled with light mould, giving them a little water and shade; or, which is better, plunging them into a hot-bed, and covering them with hand-glasses. When they are become firmly established in the autumn, they should be carefully removed into separate pots, being replaced in the hot-bed till re-rooted, after which they should have the management of other shrubby green-house plants.

The first ort produces a fine effect in the borders, clumps, &c. while growing, as well as in pots when the flowers are taken off. And the other sorts afford variety in green-house collections.

XYLOPHYLLA, a genus containing plants of the tender exotic kind for the stove.

It belongs to the class and order *Pentandria Trigynia*, and ranks in the natural order of *Euphorbiæ*.

The characters are: that the calyx is a six-parted coloured cup: the corolla has no petals; but nectariums composed of six glandules affixed to the germen: the stamina five short filaments and single antheræ: the pistillum is a roundish germ, three short styles, crowned with lacerated stigmas: the pericarpium is a roundish trilocular capsule: the seeds double.

The species cultivated are: 1. *X. longifolia*, Long-leaved Love Flower; 2. *X. latifolia*, Broad-leaved Love Flower; 3. *X. falcata*, Falcated Love Flower.

The first rises with four-angled branches, which are set with long linear leaves. It is a native of America.

The second species also rises with round branches: the leaves are broad spear-shaped. It is a native of the West Indies.

The third has a woody stem and branches: the leaves are linear spear-shaped, shining, placed irregularly: and at the upper part of the branches the flowers are produced upon the edges of the leaves, being very closely placed. It is a native of America.

Culture.—These plants are increased by sowing the seeds in pots in the early spring, and plunging them in a hot-bed: when the plants are come up two or three inches in growth, they should be pricked out in separate pots, replunging them in the bark-bed: they may afterwards be managed as other stove plants of a similar growth.

They are also, some of them, capable of being raised by off-sets, slips, and cuttings, assisted by a hot-bed in the same manner.

They require the constant protection of the stove in winter, but in the hot summer months may be set out in their pots in a sheltered situation, being taken in on the approach of cold nights.

They afford variety, and are curious in stove collections.

YEW TREE. See TAXUS.

YUCCA, a genus containing plants of the succulent, evergreen, shrubby, hardy, and tender kinds.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Lilia*.

The characters are: that there is no calyx: the corolla is monopetalous, bell-shaped, and divided into six large oval segments: the stamina, six very short reflexed filaments, having small antheræ: the pistillum is an oval three-cornered germ, longer than the stamina; no style, but an obtuse three-furrowed stigma: the pericarpium is an oblong, triangular, trifid, trivalved capsule of three cells, containing many seeds lying over one another in a double series.

The species cultivated are: 1. *Y. gloriosa*, Common Adam's Needle; 2. *Y. filamentosa*, Thready Virginian Yucca; 3. *Y. aloifolia*, Aloe-leaved Yucca; 4. *Y. Draconis*, Dragon Tree-leaved Yucca.

The first has an erect, ligneous, thick stem, two or three feet in height, having very long, narrow, stiff, entire leaves, ending in a long, sharp, black spine, garnishing the stem almost to the bottom, and in a large tuft at top: from the centre of the top leaves rises a long branching peduncle, sustaining a panicle of bell-shaped white and purple flowers. It is a native of Canada, flowering in August.

The second species rises with an upright, thick, ligneous stem, two or three feet high, adorned at top with a tuft of very long spear-shaped, stiff, blunt-pointed, sawed, filamentose leaves, emitting long threads from the sides, hanging downward; and from the top of the stem amidst the leaves an erect peduncle or flowerstalk, several feet high, which is set with many large white and purple striped leaves. It is a native of Virginia, flowering in August and September.

The third rises with an erect, thick, fleshy stem, eight or ten feet in height: it is crowned with a large tuft of long, narrow, stiff, crenated, aloe-like leaves ending in sharp spines: from the centre of the crown of leaves comes out the flowerstalk, branching pyramidally two or three feet in height, having all the branches terminating in a spike of flowers, purple without and white within, appearing in August and September. It is a native of America.

The fourth species has an upright, thick, brown stem, three feet in height, crowned with long, narrow, serrated leaves ending in spines and nodding downward: in the centre of the leaves arises the flowerstalk very branchy, with all the branches terminating in spikes of flesh-coloured flowers, which appear in August and September. It is also a native of America.

Culture.—These plants are all capable of being raised by off-sets or suckers, from the roots and heads of the old plants, as well as by seed.

The off-sets and suckers may be taken off any time in the spring or summer seasons, being laid in some dry place for a few days, till the wounded part caused by the separation from the plant is dried and healed over; when they may be planted out separately in pots of light sandy compost, and be placed in a shady situation till they have taken root in a perfect manner. When assisted by a hot-bed, they often succeed better.

The seed obtained from abroad should be sown in the spring in pots of light earth, plunging them in a hot-bed, in which the plants soon come up; and when they are two or three inches high, they should be pricked out separately in small pots of light sandy mould, re-plunging them in the hot-bed to forward their growth, assisting them with moderate waterings and fresh air daily, and hardening them by degrees to the full air, so as to be set out in June to remain till October, when they should be removed into the green-house for the winter.

Some plants of all the sorts should constantly be preserved in pots.

They are all very ornamental; the two first after they have been hardened, in the dry borders, where the soil is light and where the situation is warm and sheltered; and the others in green-house collections, among other potted plants.

ZANTHOXYLUM, a genus containing plants of the hardy and tender exotic shrubby kinds.

It belongs to the class and order *Diœcia Pentandria.*

The characters are: that the male flowers have the calyx a perianthium deeply cut into five oval coloured parts: there is no corolla: the stamina have five awl-shaped erect filaments, with didymous, sulcated, roundish antheræ: — female flower, calyx as the male: there is no corolla: the pistillum, a roundish germen, an awl-shaped style, with an obtuse stigma: the pericarpium, an oblong capsule, formed of two valves and one cell, containing a single smooth roundish seed.

The species cultivated are: 1. *Z. Clava Herculis,* Canada Tooth-ach Tree, or Hercules's Club; 2. *Z. trifoliatum,* Chinese Tooth-ach Tree.

The first grows to the height of twelve feet, with a rough bark armed with short spines: the leaves are winged, of a dark-green colour, growing irregularly on the branches; each consists of four or five pair of spear-shaped folioles, which are terminated by an odd one: the flowers come out from the end of the branches in loose panicles; they are apetalous and have no great appearance, and succeeded by unilocular capsules, containing the seeds. It is a native of North America.

There is a variety; the Ash-leaved Tooth-ach Tree, with oval-oblong folioles, and prickly mid-ribs.

The second species rises with a woody stem, branching several feet in height, being set with trifoliate leaves, composed of three egg-oval folioles. It is a native of China.

Culture.—These plants may be increased by seeds and layers.

The seeds should be sown in the spring, either in an east border, or in pots placed in the morning sun all the summer, being sheltered in a frame in winter; and in the spring following removed to the full air till October, giving proper waterings all the summer; and towards winter be placed again under shelter from frost till March, when the young plants may be potted separately; and thus continued for a year or two, being sheltered in the winter, when they may be transplanted into the shrubbery, where they are to remain.

The layers of the young wood may be laid down in autumn or early spring, and when they have stricken good root be taken off and managed as the seedlings.

They also succeed by cuttings in spring or summer, planted in pots, assisted by a hot-bed, in which they soon strike, when they should be inured to the full air; and the young plants will be fit for planting out in the autumn, or the spring following.

The first is a very ornamental plant in the borders and other dry parts of shrubberies, and the latter among potted plants in the green house collections.

ZEA, a genus containing a plant of the hardy herbaceous annual kind.

It belongs to the class and order *Monœcia Triandria,* and ranks in the natural order of *Gramineæ.*

The characters are: that male and female flowers are separate on the same plant; loosely disposed: the calyx, a bivalve, two-flowered husk: the corolla, two oblong valves, the outward one obtuse and bellied, and the interior bidented at top, and are inclosed in the calyx, with a very short, diphyllous nectarium: the stamina, three capillary filaments in the males, with bifid prismatic antheræ, opening at top; the female flowers are closely collected in a spike below the males on the same plant: the calyx a single-flowered husk, with two valves; with a corolla, a glumose husk, and four membraneous unequal valves: the pistillum, a very small germen, slender pendulous style, and simple stigma: there is no pericarpium: many compressed, roundish seeds, immersed in an oblong, thick five-angled receptacle, forming together a long, thick, close head of corn.

The species cultivated is *Z. Mays,* Maize, or Indian Corn.

It rises with a large, strong, herbaceous stem, ten or twelve feet high, garnished with long, broad, pendulous leaves: male flowers at the upper part of the stalks, in spikes eight or ten inches long; and females arising at the axillas of the leaves below the males, in long, close, thick spikes, covered with thin leaves; and succeeded by numerous seeds placed round the long receptacle in a compact order. Native of America.

There are varieties; with yellowish-white seeds, with deep yellow seeds, and with purple-blue seeds.

Culture.—These plants may be raised by sowing seed in the spring, as March or April, in a dry warm situation, where the plants are intended to remain, in patches, of two or three

seeds or more in each, about an inch and half deep: when the plants are come up, they should be thinned out to one or two of the strongest. But to have the plants more forward, so as to produce ripe seed-spikes more effectually, some should be sown in a hot-bed at the same time, and when the plants are three or four inches high, be forwarded by pricking them out upon another hot-bed, either under a deep frame or an awning of hoop arches to be covered with mats occasionally, allowing them plenty of free air; and when they have sufficient growth, as in May, they may be transplanted, with balls of earth about their roots, into the full ground in the borders or shrubbery clumps, in warm sunny situations, being well watered; and when the summer proves warm and dry, they often produce perfect heads, and the seeds ripen in a good manner.

As the plants mostly run up in tall stalks, it is proper to support each with a tall neat stake, especially where much exposed to wind and rain.

These plants in the different varieties have a fine effect in the back parts of borders, clumps, and other places, in warm sheltered situations.

ZINNIA, a genus containing plants of the annual flowering kind.

It belongs to the class and order *Syngenesia Polygamia Superflua*.

The characters are: that the calyx has the general cup oval, cylindric, and imbricated, with many blunt, upright, persistent scales: the corolla compound and radiated, consisting of hermaphrodite florets, placed in the disk, and female ones, which are ligulated, and form the rays: the stamina of the hermaphrodites are five short filaments, with cylindric tubulose antheræ: the pistillum is an oblong aristated germ, with a slender semibifid style, and two erect obtuse stigmas: in the female flowers the germen is oblong and triquetrous, with a capillary style, and two recurved stigmas: the pericarpium has the calyx containing oblong solitary seeds crowned with down, and placed on a paleaceous receptacle.

The species cultivated are: 1. *Z. pauciflora*, Few-flowered Yellow Zinnia; 2. *Z. multiflora*, Many-flowered Red Zinnia.

The first has the root fibrous, from which arises the stalk to about three feet high; it is woody below, and branches upwards, which are placed opposite: these are furnished with oblong leaves of a pleasing green colour; the flowers terminate the ends of the branches on long footstalks; they are of a yellow colour, which decays before the seeds are ripe. It is an annual.

The second species is also annual: the stalk rises erect with upright branches; these are channelled and hairy: the leaves are oval, lanceolate, and placed opposite: the flowers come out at the extreme part of the branches: the florets of the disk are yellow, and those which form the rays are of a dusky red; these continue till the seed is ripe, which is in the autumn.

Culture.—These annual plants are increased from seeds, which should be sown on a slight hot-bed in the early spring, as March, and when the plants are a few inches high, they should be pricked out on another bed previously prepared to receive them, where they should remain till the advance of summer, when they may be taken up and planted out in the borders of the pleasure-ground, where they blow and complete their seeds for the year following.

They have a fine effect in their leaves and flowers in these situations.

ZYGOPHYLLUM, a genus comprising plants of the herbaceous and woody succulent exotic kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Rutaceæ*.

The characters are: that the calyx consists of five oval, obtuse, concave, erect leaves: the corolla has five obtuse petals emarginated at top, and a ten-leaved closed nectarium, which includes the germen: the stamina, ten awl-shaped filaments, and oblong incumbent antheræ: the pistillum, an oblong germen, awl-shaped style, crowned by a simple stigma: the pericarpium, an oval, pentagonous, quinquevalvulous capsule of five cells, having many roundish seeds.

The species are: 1. *Z. Fabago*, Common Bean Caper; 2. *Z. sessilifolium*, African Bean Caper; 3. *Z. Morgsana*, Purslane-leaved Æthiopian Bean Caper; 4. *Z. spinosum*, Thorny Bean Caper; 5. *Z. album*, White Egyptian Bean Caper.

The first has a thick, fleshy, deeply-striking, perennial root: the stalks upright, round, smooth, jointed, herbaceous, green, three or four feet in height, being set with oval, smooth, fleshy, blueish-green leaves, two or three together on each petiole, and reddish flowers by two or three together at the axillas of the stalks, appearing in July, succeeded by long capsules, containing the seed, ripening in autumn. It is durable in root; but the stalks, being herbaceous, perish every autumn. It is a native of Asia.

The second species rises with an upright woody stem, branching numerously and irregularly, three or four feet in height: the leaves oval spear-shaped, thick, smooth, succulent, sessile, surrounding the branches by fours: the flowers yellow, on long slender footstalks at the

sides of the branches, appearing in succession great part of summer. It is a native of Africa.

There are varieties; with yellow flowers, with sulphur-coloured flowers, with white flowers, with copper-coloured flowers, having mostly a reddish or brown spot near the base of each petal.

The third rises with a shrubby stem, dividing and branching irregularly, three or four feet in height: the leaves oval, thick, obtuse, succulent, surrounding the branches by fours: the flowers are sulphur-coloured, on long footstalks from the sides of the branches, appearing most part of summer. It is a native of Africa.

There is a variety with flame-yellow-coloured flowers.

The fourth species has under-shrubby stalks: the leaves close-sitting, with linear acute folioles. It is a native of Africa.

The fifth has the leaves foot-stalked, and clubbed fleshy lobes.

Culture.—The first sort is raised from seeds, which should be sown in the spring in pots filled with light sandy mould, or on a hot-bed. When the plants have a few inches growth, they should be removed into separate pots plunging them into a hot-bed, admitting air so as gradually to harden them to the open ground. They should be protected for a winter or two, and then be turned out into borders, or other parts, where the situation is warm and the soil dry and rubbishy, as they are of a succulent nature.

The other sorts are capable of being increased by cuttings and seeds; the cuttings should be planted out in the spring or summer in pots filled with light sandy mould, and plunged in a hot-bed, being occasionally watered, when they quickly emit rots, and shoot at top; and when sown in the summer months, they may be planted in a shady place, or in pots placed in the shade, giving frequent waterings, when they will also take good rooot. In either method, they should be potted off separately towards autumn, in order to be moved into the green-house or glass-case in the beginning of autumn.

The seed should be sown in the spring in pots of light earth, and be plunged in a hot-bed, where they soon come up: when a little advanced in growth, they should be pricked out in separate small pots, being watered and replunged into the hot bed till well rooted, when they should be gradually hardened to the full air, and in June set out to remain till the autumn, when they should be placed in the green house, or some other place where they may have protection for the winter.

The first sort affords variety in the borders, as well as among potted plants; and the others in collections of the green-house kind.

The following is a Communication received from Mr. BUONAIUTI, *Gardener to the Right Honourable Lord* HOLLAND, *Holland-House, Kensington, which we introduce in the manner it was sent.*

DAHLIA. This genus was established by the late Cavanilles, in honour of Dr. Andrew Dahl, a Swedish botanist, and the friend of Baron Alstrœmer.

It belongs to the class and order *Syngenesia Polygamia Frustranea,* at least in this cold climate.

The stems die every winter, but the root is perennial and tuberous, not very dissimilar to that of the Artichoke.

Four species have been described.

1. *Pinnata,* pinnated as it is called, and figured by Cavanilles in his *Ic. Pl. v.* 1. *tab.* 80. It is also figured under this name in the 4th vol. of Andrews's *Bot. Repository.* In the *Annales du Mus. National Hist. Nat. v.* 3. M. Thouin calls this species *Purpurea,* but its colour varies from the common *Pinnata,* being very deep; and Mr. R. A. Salisbury suspects that this *Purpurea* of Thouin is the true *Rosea* of Cavanilles. A paler coloured variety of the *Pinnata,* the seeds of which were sent to Holland-House with the name of *Rosea* by Cavanilles, has been lately figured by Mr. Hooker in the *Paradisus Londinensis,* and described by the above-mentioned botanist, under the name of *Sambucifolia:* that it is not the true *Rosea* of Cavanilles, *Ic.* is unquestionable; for the leaves were simply pinnate, not bipinnate.

2. *Rosea,* Rose-coloured. It is so called and figured by Cavanilles in his *Icones*; but the plant called *Rosea* by M. Thouin in the *Annales,* is most probably the very variety of the first species figured by the name of *Sambucifolia* in the *Paradisus Londinensis.*

3. *Coccinea,* Scarlet. This is figured in Curtis's publication; but we entertain a doubt if it is the same with Cavanilles's plant, if the colour is well copied. The plant, we understand, is dead.

4. *Crocata,* Saffron-coloured. This plant is

not mentioned in any work previous to the *Paradisus Londinensis*, where it is figured and described by the name of *Bidentifolia*. Though the parcels of seeds which came from Cavanilles himself had the title of *Crocata*, the flowers turned out yellow.

It is not intended here to describe minutely these plants; it is sufficient to say, that they elevate themselves majestically like the Holyhock, and bear both axillary and terminal showy flowers late in the autumn.

Culture.—The first Dahlias introduced into England were lost by taking too much care of them. As they are natives of the hilly parts of Mexico, they will thrive in the open ground very well, and accustom themselves in a very few generations to ripen seeds here annually. By giving the history of those plants which have grown in the gardens of Holland-House, Kensington, it is only meant to offer hints for their culture, leaving the rest to future experience and observation.

On the 20th of May, 1804, the Right Honourable Lady Holland sent home from Spain a parcel of seeds. Though so late in the season, part of them were sown in pots in a hot-bed, and among these was the *Dahlia Pinnata*, with a wrong name on the parcel. When the plant was about fourteen inches high, it was planted in the open ground and grew luxuriantly, pushing up several stems to the height of seven and eight feet. The *Coccinea* and *Crocata*, the seeds of which also came up, but did not grow so full. In the middle of September the first flowers appeared, by which the plant was known to be the *Pinnata* of Cavanilles, and it was figured by Mr. Andrews the same year. The seeds did not ripen, and the roots were taken up on the approach of a sharp frost, and placed in the green-house in a pot for the winter.

In the spring of 1805 all the parcels of seed sent from abroad were sown, and many Dahlias came up among them, which at the time of flowering showed four distinct species or varieties. It seems that Cavanilles, and the French botanists after him, mean to make as many species as there are different coloured Dahlias; but the learned Mr. Salisbury, one of the Vice Presidents last year of the Linnean Society, considers them all simply as varieties of only two distinct species, and has in the *Paradisus Londinensis* named them, not according to their colour, but after the differences of their leaves, being inclined to believe that they will in time vary like the China Aster and Marygold.

And, in fact, with regard to the *Dahlia Pinnata*, now commonly called *Purpurea*, we have great reason to confirm that botanist's suspicion, having seen nine different varieties of it, either in the colour or multiplication of the petals. The flower, in its natural state, has only eight *ligulated* petals: a few had twelve. There was also one plant with archdouble flowers, exceedingly pale: another with archdouble flowers, exceeding deep purple, exactly like that figured in the *Annales du Mus.* but the flowers were so complicated together, and the autumn of 1805 so cold, they never expanded. We must observe, that the leaves of this plant were bipinnated, but whether it is a real distinct species is not yet positively ascertained.

The *Dahlia Rosea* was last year (1805) the most handsome, and ripened plenty of seeds. The *Purpurea* ripened fewer and weaker seeds, though they now (10th May, 1806) come up freely; the plants, however, look weak. Of the seeds of *Coccinea* and *Crocata*, no plants have yet appeared, though to the eye they seemed as perfect as those imported from Spain.

All the plants of 1805, except one, were taken up before Christmas, and planted in pots or large pans; but though kept in a very cold greenhouse, they began to push new shoots in the middle of April, and will be planted in the open ground without the help of any artificial heat. Some rich mould round the roots is the only culture they require. The plant left all the winter out of doors was situated close to a south wall; and though it had no covering of any kind, it is now pushing up new shoots. It is necessary to add, that several plants of Dahlias have been raised by cuttings, which are now in good health, and which will probably flower and produce seeds next autumn.

10th July, 1806. Above a hundred plants of Dahlias are now growing in various parts of the gardens at Holland-House in the highest luxuriance: among them are several of the yellow-flowered *Bidentifolia*, raised from seeds saved there last year, though the autumn proved so unfavourable. One plant of the *Purpurea* of Andrews's Bot. Repository is already showing flowers.

The true *Rosea* of Cavanilles, with doubly pinnated leaves, is also growing most vigorously, and one of its stems has been pinched to produce lateral shoots for cuttings. A plant left in the middle of one of the borders of the French garden at Holland-House by mistake, and exposed to the severity of the winter, without any shelter, is as strong and vigorous as any of the other two-year old plants; so that there is not a doubt that this magnificent genus will soon be a common ornament of the gardens in this island.

In plate 19* is a representation of a plant of the *Dahlia Pinnata* or *Purpurea*.

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Acorus	Sweet Rush
Acrostichum	Acrostichum
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Adiantum	Maiden Hair
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Aletris	Guinea Aloe
Allium	Garlick, Onion, Leek, &c.
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Anethum	Dill, Fennel, &c.
Angelica	Angelica
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Blitum Blite, or Strawberry Spinach
Bocconia Parrot-Weed, Tree Celandine
Bombax Silk-Cotton Tree
Bontia Bontia, Barbadoes Wild Olive
Borago Borage
Borbonia Borbonia
Bosca Golden-rod Tree
Brassica Cabbage, Cauliflower, Brocoli, Turnep
Bromelia Pine Apple
Browallia Browallia
Brunia Brunia
Brunsfelsia Brunsfelsia
Bubon Bubon
Bucknera Bucknera
Buddlea Buddlea
Bulbocodium Mountain Saffron
Buphthalmum Ox-eye
Bupleurum Hare's Ear
Butomus Flowering Rush
Buxus Box Tree

Cacalia Foreign Colt's Foot
Cactus Melon Thistle, Creeping Cereus, &c.
Cæsalpinia Barbadoes Flower Fence
Calendula Marigold
Calla Æthiopian Arum
Callicarpa Callicarpa
Caltha Marsh Marigold
Calycanthus Carolina Allspice
Camellia Japan Rose
Campanula Bell Flower
Canarina Canary Bell Flower
Canella White Cinnamon
Canna Indian Flowering Reed
Capparis Caper Bush
Capsicum Guinea Pepper
Carica Papaw Tree
Carpinus Hornbeam
Carthamus Bastard Saffron
Carum Caraway
Caryophyllus Clove Tree
Cassia Wild Senna
Cassine Hottentot Cherry
Catananche Candy Lion's Foot
Catesbæa The Lily Thorn
Ceanothus New Jersey Tea
Cedrela Bastard Cedar
Celastrus Staff Tree
Celosia Cock's Comb
Celsia Celsia
Celtis Nettle Tree
Centaurea Centaury Blue Bottle, &c.
Cephalanthus Button Tree
Cerastium Mouse-ear Chickweed
Ceratonia Carob Tree
Cercis Judas Tree
Cerinthe Honey Wort
Cestrum Bastard Jasmine
Chamærops Dwarf Palm
Cheiranthus Wall Flower, Stock, &c.
Cheledonium Horned Poppy
Chelone Chelone
Chenopodium Goosefoot
Chiococca Snowberry Tree
Chionanthus Virginian Snowdrop, Fringe Tree
Chironia Chironia
Chrysanthemum Chrysanthemum
Chrysobalanus Cocoa Palm
Chrysocoma Goldy Locks
Chrysophyllum Broad-leaved Star-Apple
Cichorium Succory, or Endive

Cineraria Cineraria, Sky Flower
Cistus Cistus, Rock Rose
Cithæroxylon Fiddle Wood
Citrus Citron Tree, Orange Tree, &c.
Clematis Virgin's Bower
Cleome Cleome
Clethra Clethra
Cliffortia Cliffortia
Clitoria Clitoria
Clusia Balsam Tree
Cluytia Cluytia
Cneorum Widow Wail, Spurge Olive
Coccoloba Sea-side Grape
Cochlearia Horse Radish
Cocos Cocoa Nut Tree
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Colutea Bladder Sena
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Convolvulus Convolvulus
Conyza Flea Bane
Copaifera Balsam of Capivi Tree
Cordia Cordia
Coreopsis Thick-seeded Sun-Flower
Coriandrum Coriander
Coriaria Myrtle-leaved Sumach
Cornus Dog-Wood
Cornutia Cornutia
Coronella Coronella
Cortusa Bear's-Ear, Sanicle, or Matthiolus
Corylus Hazel, or Nut Tree
Corypha Fan Palm
Cotyledon Navel-Wort
Crambe Sea Cabbage
Crassula Lesser Orpine, or Live Ever
Cratægus Hawthorn, Wild Service, &c.
Cratæva Garlick Pear
Crepis Bastard Hawk-Weed
Crescentia Calabash Tree
Crinum Crinum
Crithmum Sea or Rock Samphire
Crocus Crocus
Crotalaria Crotalaria
Croton Tallow Tree
Cucumis Cucumber Melon
Cucurbita Gourd, Pompion, &c.
Cupressus Cypress Tree
Cyclamen Snow-bread
Cynara Artichoke, Cardoon
Cynoglossum Hound's Tongue
Cypripedium Lady's Slipper
Cyrtanthus Cyrtanthus
Cytisus Cytisus or Laburnum

Dais Dais
Daphne Spurge Laurel, Mezereon
Datura Thorn Apple
Daucus Common Carrot
Delphinium Dolphin Flower
Dentaria Tooth-Wort
Dianthus Sweet William, Pink, &c.
Dictamnus White Dittany
Digitalis Fox Glove
Dionæa Venus's Fly Trap
Diosma Diosma
Diospyros Indian Date Plum
Dirca Leather-Wood
Disandria Disandria
Dodartia Dodartia
Dodecatheon Virginian Cowslip, or Meadia

Dodonæa Dodonæa
Doronicum Leopard's Bane
Dracæna Dragon Tree
Dracocephalum Dragon's Head, Balm of Gilead, &c.
Dracontium Perforate-leaved Dragon

Ebenus Ebony
Echinops Globe Thistle
Ehretia Ehretia
Elæagnus Wild Olive
Elephantopus Elephant's Foot
Empetrum Black-berried Heath
Ephedra Shrubby Horse Tail
Epigæa Trailing Arbutus
Epilobium Willow Herb
Epimedium Alpine Barrenwort
Erica Heath
Erigeron Erigeron
Erinus Erinus
Eriocephalus Eriocephalus
Eryngium Eryngo, Sea Holly
Erysimum Hedge Mustard
Erythrina Coral Tree
Erythronium Dog's Tooth Violet
Eugenia Eugenia
Euonymus Spindle Tree
Eupatorium Hemp Agrimony
Euphorbia Spurge

Fagara Fagara
Fagus Beech Tree
Ferraria Ferraria
Ferula Fennel Giant
Ficus Fig Tree
Fothergilla Fothergilla
Fragaria Strawberry
Fraxinus Ash Tree
Fritillaria Fritillary
Fuchsia Fuchsia
Fumaria Fumitory

Galanthus Snow Drop
Garcinia Garcinia
Gardenia Cape Jasmine
Genista Broom
Gentiana Gentian
Geranium Crane's Bill
Geum Herb Bennet
Gladiolus Sword Lily
Gleditsia Three-thorned Acacia
Globularia Globular Blue Daisy
Gloriosa Superb Lily
Gloxinia Gloxinia
Glycine Glycine or Kidney Bean Tree
Glycyrrhiza Common Liquorice
Gnaphalium Tree Everlasting
Gomphrena Annual Globe Amaranth
Gordonia Loblolly Bay
Gorteria Gorteria
Gossypium Cotton Shrub
Grewia Grewia
Guaiacum Lignum Vitæ
Guilandina Bonduc, or Nicker Tree

Hæmanthus Blood Flower
Hæmatoxylum Blood Wood, or Logwood Tree
Halesia Snow-Drop Tree
Hatteria African Fly Honeysuckle
Hamamelis Witch Hazel
Hedera Common Ivy
Hedysarum French Honeysuckle

Helianthus Annual Sun-Flower
Heliconia Bastard Plantain
Helicteres Screw Tree
Heliotropium Peruvian Turnsole
Helleborus Winter Hellebore
Helonias Helonias
Hemerocallis Day Lily
Hermania Hermania
Hernandia Jack-in-a-box Tree
Hesperis Night-smelling Rocket
Hibiscus Hibiscus
Hieracium Hawkweed
Hippophae Sea Buckthorn
Humulus Hop
Hura Sand-Box Tree
Hyacinthus Hyacinth
Hydrangea Hydrangea
Hydrastis Canadian Yellow-root
Hymenæa Locust Tree
Hyoscyamus Common Henbane
Hypericum St. John's Wort, &c.
Hyssopus Hyssop

Iberis Candy Tuft
Ilex Common Holly
Illecebrum Illecebrum
Impatiens Common Yellow Balsam
Indigofera Dyer's Indigo
Inula Inula
Ipomæa Ipomæa
Iris Iris
Itea Itea
Iva False Jesuit's Bark Tree
Ixia Ixia
Ixora Ixora, or Indian Wild Jasmine

Jacquinia Jacquinia
Jasminum Common Jasmine
Jatropha Physic Nut
Juglans Walnut Tree
Juniperus Common Juniper
Justicia Justicia

Kæmpferia Galangale
Kalmia Kalmia
Kiggelaria Kiggelaria
Knautia Knautia

Lachenalia Lachenalia
Lactuca Common Lettuce
Lagerstræmia Lagerstræmia
Lagoecia Wild Cummin
Lantana Lantana
Lathyrus Everlasting Pea
Lavandula Common Lavender
Lavatera Lavatera, Tree Mallow
Laurus Common, Sweet Bay
Lawsonia Lawsonia
Ledum Marsh Ledum, or Wild Rosemary
Lepidium Common Cress
Leucojum Great Snow Drop
Ligusticum Common Lovage
Ligustrum Common Privet
Lilium Lily, Common White, &c.
Limodorum Limodorum
Linum Flax
Liquidambar Liquidambar
Liriodendrum Tulip Tree
Lobelia Cardinal Flower
Lonicera Honeysuckle
Loranthus Loranthus

Lotus Bird's Foot Trefoil, Winged Pea
Lunaria Honesty
Lupinus Lupine
Lychnis Lychnis, Wild Campion
Lycium Box Thorn
Lysimachia Loose Strife
Lythrum Willow Herb

Magnolia Magnolia
Mahernia Mahernia
Malope Malope
Malpighia Barbadoes Cherry
Malva Mallow
Mammea Mammee Tree
Mangifera Mango Tree
Maranta Indian Arrow Root
Marrubium Horehound
Martynia Martynia
Massonia Massonia
Matricaria Common Feverfew
Mauritia Maiden-hair Tree
Medeola Medeola
Medicago Tree Medic
Melastoma American Gooseberry
Melia Bead Tree
Melianthus Honey Flower
Melissa Baum
Melittis Bastard Baum
Menispermum Moon-Seed
Mentha Mint
Mesembryanthemum Fig Marigold
Mespilus Medlar
Mesua Indian Mesua
Michauxia Michauxia
Michelia Indian Michelia
Mimosa Mimosa
Mimulus Monkey-Flower
Mirabilis Marvel of Peru
Moluccella Molucca Baum
Momordica Male Balsam Apple
Monarda Monarda, Lion's Tail
Monsonia Monsonia
Moræa Moræa
Morina Morina
Morus Mulberry Tree
Musa Banana Tree
Myrica Candleberry Myrtle
Myrsine African Myrsine
Myrtus Common Myrtle

Napæa Napæa
Narcissus Common Daffodil, &c.
Nepeta Common Catmint
Nerium Common Rosebay
Nicotiana Tobacco
Nigella Fennel Flower
Nolana Nolana
Nyctanthes Nyctanthus
Nymphæa Water Lily
Nysso Tupelo Tree

Ocimum Basil, or Basilicum
Œnothera Tree Primrose
Olea European Olive
Ononis Rest Harrow
Ophioxylum Ophioxylum
Ophrys Ophrys, or Twayblade
Orchis Orchis
Origanum Origany, or Marjoram
Ornithogalum Star of Bethlehem
Orobus Bitter Vetch

Oryza Rice
Osteospermum Osteospermum
Osyris Poet's Cassia
Othonna Ragwort
Oxalis Wood Sorrel

Pæonia Peony
Panax Panax
Pancratium Pancratium
Pandanus Pandanus
Papaver White Poppy
Parietaria Tree Pellitory
Parkinsonia Parkinsonia
Parthenium Parthenium
Passerina Sparrow Wort
Passiflora Passion Flower
Pastinaca Parsnip
Pelargonium Crane's Bill, &c.
Pentapetes Pentapetes
Pentastemon Bastard Asarum
Periploca Periploca
Petiveria Guinea-Hen Weed
Petrea Petrea
Phaseolus Kidney Bean
Philadelphus Syringa, Mock Orange
Phillyrea Phillyrea
Phlomis Phlomis
Phlox Lychnidea, or Bastard Lychnis
Phœnix Date Plum Tree
Phylica Phylica
Phyllanthus Sea-side Laurel
Phyllis Bastard Hare's Ear
Physalis Winter Cherry
Phytolacca Phytolacca
Pimpinella Anise
Pinus Wild Pine Tree, Fir, &c.
Piper Black Pepper
Piscidia Jamaica Dogwood Tree
Pisonia Prickly Pisonia
Pistacia Pistacia
Pisum Common Pea
Platanus Plane Tree
Plinea Plinea, or Myrtle
Plumbago European Leadwort
Plumeria Plumeria
Polemonium Polemonium, Greek Valerian
Polyanthes Indian Tuberose Hyacinth
Polygala Polygala, Milk Wort
Polygonum Knot Grass, Persicaria
Populus Poplar Tree
Portlandia Portlandia
Portulaca Purslane
Portulacaria African Purslane Tree
Potentilla Cinquefoil
Poterium Garden Burnet
Prasium Hedge Nettle
Primula Primrose, Auricula
Prinos Winter Berry
Protea Protea
Prunus Plum Tree, Apricot, Cherry Tree, &c.
Psidium Guava Tree
Psoralea Psoralea
Ptelea Ptelea, or Shrubby Trefoil
Pulmonaria Lungwort
Punica Pomegranate Tree
Pyrus Pear Tree, Apple Tree, and Quince

Quercus Oak Tree

Ranunculus Garden Ranunculus
Raphanus Garden Radish

Rauwolfia	Rauwolfia
Reseda	Sweet Reseda, or Mignionette
Rhamnus	Buckthorn, Alaternus, &c.
Rheum	Rhubarb
Rhexia	Rhexia, American Soapwort
Rhodiola	Yellow Roseroot
Rhododendrum	Rhododendron, Dwarf Rose Bay
Rhus	Sumach, Poison Tree
Ribes	Currant Tree, Gooseberry
Ricinus	Common Palma Christi
Rivinia	Rivinia
Robinia	False Acacia
Rondeletia	Rondeletia
Rosa	Rose Tree and Sweet Brier
Rosmarinus	Rosemary
Royena	African Bladder Nut
Rubia	Dyer's Madder
Rubus	Raspberry, Bramble
Rudbeckia	Rudbeckia
Rumex	Sorrel, Dock
Ruscus	Butcher's Broom
Ruta	Rue
Saccharum	Sugar Cane
Salix	Willow Tree, Osier
Salsola	Shrubby Saltwort, Stonecrop Tree
Salvia	Sage
Sambucus	Elder Tree
Sanguinaria	Puccoon, Bloodwort
Santolina	Lavender Cotton
Sapindus	Soap-berry Tree
Saponaria	Soapwort
Sarracenia	Saddle Flower
Satureia	Savory
Satyrium	Satyrion, or Lizard-flower
Saxifraga	Saxifrage
Scabiosa	Scabious
Scandix	Garden Chervil
Schinus	Mastic Tree
Scilla	Squill
Scorpiurus	Caterpillar Plant
Scorzonera	Viper's Grass, Spanish Scorzonera
Scrophularia	Figwort
Scutellaria	Skull-cap
Sedum	Stonecrop, Houseleek
Selago	Selago
Sempervivum	Houseleek, Tree Sedum
Senecio	Groundsel
Serratula	Saw-wort
Sida	Sida, Indian Mallow
Sideritis	Iron-wort
Sideroxylon	Iron-wood
Silene	Catchfly
Silphium	Silphium
Sinapis	Mustard
Sisymbrium	Water-cress
Sisyrinchium	Sisyrinchium
Sium	Skirret
Smilax	Smilax
Smyrnium	Common Alexanders
Solanum	Nightshade, Love Apple, Potatoe
Saldanella	Soldanella
Solidago	Golden Rod
Sophora	Sophora
Sorbus	Mountain Service, Mountain Ash, &c.
Spartium	Broom
Spermacoce	Button-weed
Spinacia	Garden Spinach
Spiræa	Spiræa
Spondias	Hog Plum
Stapelia	Stapelia
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Statice	Thrift, or Sea Gilliflower, Pink
Strelitzia	Strelitzia
Stuartia	Malacodendron
Styrax	Storax
Swietenia	Mahogany Tree
Symphytum	Comfrey
Syringa	Lilac
Tabernæmontana	Tabernæmontana
Tagetes	French and African Marygold
Tamarindus	Tamarind Tree
Tamarix	Tamarisk
Tamus	Black Bryony
Tanacetum	Tansy, &c.
Tarchonanthus	Shrubby African Flea-Bane
Taxus	Yew Tree
Telephium	True Orpine
Tetragonia	Tetragonia
Teucrium	Germander
Thalictrum	Meadow Rue
Thea	Tea Tree
Theobroma	Chocolate Nut Tree
Thuja	Arbor Vitæ, &c.
Thymbra	Mountain Hyssop
Thymus	Thyme
Tilia	Lime Tree
Tinus	Tinus, or Tree Volkameria
Toluifera	Balsam of Tolu Tree
Tournefortia	Tournefortia
Trachelium	Throatwort
Tradescantia	Virginian Spiderwort
Tragopogon	Goat's Beard, Salsafy
Trillium	Trillium
Triumfetta	Triumfetta
Tropæolum	Nasturtium, or Indian Cress
Tulipa	Tulip
Turnera	Turnera
Ulex	Furze, Gorse, or Whins
Ulmus	Elm Tree
Urena	Indian Mallow
Valeriana	Valerian
Veratrum	Hellebore
Verbascum	Mullein
Verbena	Vervain
Verbesina	Indian Hemp Agrimony
Veronica	Veronica, Speedwell
Viburnum	Wayfaring Tree, Guelder Rose, Laurustinus
Vicia	Garden Bean
Vinca	Periwinkle
Viola	Violet, Heart's Ease
Vitex	Chaste Tree
Vitis	Vine Tree
Volkameria	Volkameria
Wachendorfia	Wachendorfia
Waltheria	Waltheria
Wintera	Winterana
Xeranthemum	Eternal Flower
Xylophylla	Love Flower
Yucca	Adam's Needle
Zanthoxylum	Tooth-ach Tree
Zea	Maize, or Indian Corn
Zinnia	Zinnia
Zygophyllum	Bean Caper

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Indian Shot	*Canna*
Indigo	*Indigofera*
Indigo, Bastard	*Amorpha*
Iris	*Iris*
Iris, Bulbous	*Iris*
Iris, Persian Bulbous	*Iris*
Iris Uvaria	*Aletris*
Iron Wood	*Sideroxylum*
Iron Wort	*Sideritis*
Ivy	*Hedera*
Ivy, American	*Kalmia*
Jaca Tree	*Artocarpus*
Jacinth	*Hyacinthus*
Jack-in-a-box	*Hernandia*
Jacob's Ladder	*Polemonium*
Jacobæa Lily	*Amaryllis*
Jalap	*Mirabilis*
Jalap	*Convolvulus*
Jasmine	*Jasminum*
Jasmine, Arabian	*Jasminum*
Jasmine, Cape	*Gardenia*
Jasmine, Bastard	*Cestrum*
Jasmine, Scarlet	*Bignonia*
Jasmine, Red	*Plumaria*
Jasmine, Persian	*Syringa*
Jericho, Rose of	*Anastatica*
Jersey Tea, New	*Ceanothus*
Jerusalem Artichoke	*Helianthus*
Jerusalem, Oak of	*Chenopodium*
Jerusalem Sage	*Phlomis*
Jesuit's Bark Tree, True	*Cinchona*
Jesuit's Bark Tree, False	*Iva*
Jew's Frankincense	*Styrax*
Johnsonia	*Callicarpa*
Jonquil	*Narcissus*
Judas Tree	*Cercis*
Jujube Tree	*Rhamnus*
July Flower, Clove	*Dianthus*
July Flower, Queen's	*Hesperis*
July Flower, Stock	*Cheiranthus*
Juniper Tree	*Juniperus*
Jupiter's Beard	*Anthyllis*
Jupiter's Beard, American	*Amorpha*
Kadanaku	*Aloe*
Kale	*Brassica*
Kale, Sea	*Crambe*
Kalmia	*Kalmia*
Kermes Oak	*Quercus*
Ketmia, Bladder	*Hibiscus*
Kidney Bean	*Phascolus*

Kidney Bean Tree	*Glycine*
Kidney Vetch	*Anthyllis*
King's Spear	*Asphodelus*
Knap-weed	*Centaurea*
Knee Holly	*Ruscus*
Knee Holm	*Ruscus*
Knot Grass	*Polygonum*
Labrador Tea	*Ledum*
Laburnum	*Cytisus*
Lac, or Gum Lac	*Croton*
Lace Bark	*Daphne*
Ladanum	*Cistus*
Ladder, Jacob's	*Polemonium*
Lady's Bower	*Clematis*
Lady's Cushion	*Saxifraga*
Lady's Finger	*Anthyllis*
Lady's Mantle	*Alchemilla*
Lady's Slipper	*Cypripedium*
Lady's Traces	*Ophrys*
Lamb's Lettuce	*Valeriana*
Larch Tree	*Pinus*
Larkspur	*Delphinium*
Lavender	*Lavandula*
Lavender Cotton	*Santolina*
Lavender, Sea	*Statice*
Laurel	*Prunus*
Laurel, Alexandrian	*Ruscus*
Laurel, Dwarf American	*Kalmia*
Laurel, Sea-side	*Phyllanthus*
Laurel, Spurge	*Daphne*
Laureola	*Cestrum*
Laurel-leaved Tulip Tree	*Magnolia*
Lauro-cerasus	*Prunus*
Laurustinus	*Viburnium*
Leadwort	*Plumbago*
Leather Wood	*Dirca*
Ledon	*Cistus*
Leek	*Allium*
Lemon Tree	*Citrus*
Lentisc	*Pistacia*
Leopard's Bane	*Doronicum*
Leopard's Bane, Mountain	*Arnica*
Lettuce	*Lactuca*
Lettuce, Lamb's	*Veronica*
Life, Tree of	*Thuya*
Life, Wood of	*Guaiacum*
Lignum Vitæ	*Guaiacum*
Lilac	*Syringa*
Lily	*Lilium*
Lily, African Blue	*Agapanthus*
Lily, African Scarlet	*Amaryllis*
Lily, Asphodel	*Crinum*
Lily, Atamasco	*Amaryllis*
Lily, Belladonna	*Amaryllis*
Lily, Ceylon	*Amaryllis*
Lily, Daffodil	*Pancratium*
Lily, Daffodil	*Amaryllis*
Lily, Day	*Hemerocallis*
Lily, Hyacinth	*Scilla*
Lily, Japan	*Amaryllis*
Lily, Martagon	*Lilium*
Lily, May	*Convallaria*
Lily, Mexican	*Amaryllis*
Lily, Persian	*Fritillaria*
Lily, Pyramidal	*Lilium*
Lily, Superb	*Gloriosa*
Lily, Water	*Nymphæa*
Lily of the Valley	*Convallaria*
Lily Thorn	*Catesbæa*
Lime Tree	*Citrus*
Limon	*Citrus*
Lion's Foot	*Catananche*
Lion's Tail	*Phlomis*
Liquorice	*Glycyrrhiza*
Liquorice	*Astragalus*
Liquorice Vetch, Knob-rooted	*Glycine*
Live-ever	*Sedum*
Liverwort	*Anemone*
Lobel's Catchfly	*Silene*
Loblolly Bay	*Gordonia*
Locker Gowlans	*Trollius*
Locust Tree	*Ceratonia*
Locust Tree	*Hymenæa*
Locust Tree	*Robinia*
Locust Tree, Honey	*Gleditsia*
Logwood	*Hæmatoxylum*
London Pride	*Saxifraga*
Looking-glass Plant	*Heritecra*
Looking-glass, Venus's	*Campanula*
Loose Strife	*Anagallis*
Loose Strife	*Lythrum*
Lords and Ladies	*Arum*
Lote Tree	*Celtis*
Lovage	*Ligusticum*
Love Apple	*Solanum*
Love lies Bleeding	*Amaranthus*
Lungwort	*Pulmonaria*
Lupine	*Lupinus*
Lychnidea	*Phlox*
Lychnis, Scarlet	*Lychnis*
Lychnis, Dwarf	*Silene*
Macaw Tree	*Cocos*
Macedonian Parsley	*Bubon*
Mad Apple	*Solanum*
Madder	*Rubia*
Madwort	*Alyssum*
Mahaleb	*Prunus*
Mahogany Tree	*Swietenia*
Maiden-hair Tree	*Salisburia*
Malabar Nut	*Justicia*
Male Balsam Apple	*Momordica*
Mallow	*Malva*
Mallow, Indian	*Sida*
Mallow, Rose	*Alcea*
Mallow Tree	*Lavatera*
Mallow, Venice	*Hibiscus*
Mammee-sapota	*Achras*
Mammee Tree	*Mammea*
Mandrake	*Atropa*
Mango	*Mangifera*
Mango Tree	*Mangifera*
Manihot	*Jatropa*
Mangrove Grape Tree	*Coccoloba*
Manna Ash	*Fraxinus*
Maple Tree	*Acer*
Marigold	*Calendula*
Marigold, African	*Tagetes*
Marigold, Corn	*Chrysanthemum*
Marigold, Fig	*Mesembryanthemum*
Marigold, French	*Tagetes*
Marjoram, Common Sweet	*Origanum*
Marjoram, Pot	*Origanum*
Marjoram, Wild	*Origanum*
Marjoram, Winter	*Origanum*
Marsh Elder	*Viburnum*
Marsh Mallow	*Althæa*
Marsh Marigold	*Caltha*
Martagon Lily	*Lilium*
Marum	*Satureia*
Marum, Syrian or Cretan	*Origanum*

Marvel of Peru	*Mirabilis*
Marygold	*Calendula*
Mastic Tree	*Pistacia*
Mastic Tree, Indian	*Schinus*
Mastic Herb	*Satureia*
Mastic Thyme	*Thymus*
Maudlin	*Achilles*
Maw Seed	*Papaver*
May Bush	*Cratægus*
May Lily	*Convallaria*
Meadow Rue	*Thalictrum*
Meadow Saffron	*Colchicum*
Meadow Sweet	*Spiræa*
Meadows, Queen of the	*Spiræa*
Mealy Tree	*Viburnum*
Media	*Dodecatheon*
Medlar	*Mespilus*
Medusa's Head	*Euphorbia*
Melancholy Tree	*Nyctanthes*
Melon	*Cucumis*
Melon, Water	*Cucurbita*
Melon Thistle	*Cactus*
Melopepo	*Cucurbita*
Mezereon	*Daphne*
Mignonette	*Reseda*
Milfoil	*Achillea*
Milk Vetch	*Astragalus*
Milkwort	*Polygala*
Mint	*Mentha*
Mint, Cat	*Nepeta*
Mint, Pepper	*Mentha*
Mock Orange	*Philadelphus*
Mock Privet	*Phillyrea*
Moldavian Balm	*Dracocephalum*
Moly	*Allium*
Monkey Flower	*Mimulus*
Monkey's Beard	*Adansonia*
Monk's Hood	*Aconitum*
Monk's Rhubarb	*Rumex*
Moon Seed	*Menispermum*
Moon Trefoil	*Medicago*
Moon Wort	*Lunaria*
Morocco Reed	*Adonis*
Moschatel, Tuberous	*Adoxa*
Mother of Thyme	*Thymus*
Mountain Ash	*Sorbus*
Mouse Ear	*Hieracium*
Mugwort	*Artemisia*
Mulberry Tree	*Morus*
Mulberry Blite	*Blitum*
Mullein	*Verbascum*
Mule Pink	*Dianthus*
Mushroom	*Agaricus*
Mustard	*Sinapis*
Myrrh, or Sweet Fern	*Scandix*
Myrtle	*Myrtus*
Myrtle, Candleberry	*Myrica*
Myrtle-leaved Sumach	*Coriaria*
Myrto-cistus	*Hypericum*
Myrtle, Dutch	*Myrica*
Napellus	*Aconitum*
Napo-Brassica	*Brassica*
Napus	*Brassica*
Narcisso-Leucoium	*Leucoium*
Narcissus, Common	*Narcissus*
Narcissus, Autumnal	*Amaryllis*
Nasturtium	*Tropæolum*
Navelwort, Venus's	*Cotyledon* and *Cynoglossum*
Navew	*Brassica*
Nectarine	*Amygdalus*
Nep	*Nepeta*
Nettle, Snowy	*Urtica*
Nettle, Hemp Tartarian	*Urtica*
Nettle, Canada	*Urtica*
Nettle Tree	*Celtis*
New Jersey Tea	*Ceanothus*
Nickar Tree	*Guilandina*
Nightshade	*Solanum*
Nightshade, American	*Phytolacca*
Nightshade, Deadly	*Atropa*
Nightshade, Malabar	*Basella*
Nolana	*Nolana*
Noli Me Tangere	*Impatiens*
None so Pretty	*Saxifraga*
Nose Bleed	*Achilleas*
Nut Tree	*Corylus*
Nut, Bladder	*Staphylæa*
Nut, Cashew	*Anacardium*
Nut, Chocolate	*Theobroma*
Nut, Cob	*Corylus*
Nut, Cocoa	*Cocos*
Nut, Fausel	*Areca*
Nut, Hazel	*Corylus*
Nut, Malabar	*Justicia*
Nut, Oil	*Ricinus*
Nut, Physic	*Jatropha*
Nut, Pistacia	*Pistacia*
Nut, Wall	*Juglans*
Oak	*Quercus*
Oak, Evergreen	*Quercus*
Oak, Jerusalem	*Chenopodium*
Oak, Poison	*Rhus*
Oil Nut	*Ricinus*
Old Man's Beard	*Clematis*
Oleander	*Nerium*
Oleaster	*Elæagnus*
Olive	*Olea*
Olive, Spurge	*Daphne*
Olive, Wild	*Elæagnus*
Olive, Wild, of Barbadoes	*Bontia*
Onion	*Allium*
Onion, Sea	*Scilla*
Onion Tree	*Allium*
Orach	*Atriplex*
Orach, Berry-bearing	*Blitum*
Orach, Wild	*Chenopodium*
Orange Tree	*Citrus*
Orange, Mock	*Philadelphus*
Origany	*Origanum*
Orpine	*Sedum*
Orpine, Lesser	*Crassula*
Orpine Tree	*Telephium*
Osier	*Salix*
Oswego Tea	*Monarda*
Ox-eye	*Buphthalmum*
Ox-eye Daisy	*Chrysanthemum*
Ox-slip	*Primula*
Oxyacantha	*Berberis*
Oxycedrus	*Juniperus*
Pæony	*Pæonia*
Painted Lady	*Dianthus*
Painted Lady Pea	*Lathyrus*
Palm Tree	*Chamærops*
Palm Tree, Dwarf	*Chamærops*
Palm, Cocoa Nut	*Cocos*
Palm, Fausel Nut	*Areca*
Palm, Mountain Fan	*Corypha*
Palma Christi	*Ricinus*
Palmetto	*Chamærops*

Pansies, or Pansy	*Viola*
Papaw Tree	*Carica*
Papaw Tree, North American	*Annona*
Paradise, Tree of	*Musa*
Park Leaves	*Hypericum*
Parsley	*Apium*
Parsley, Macedonian	*Bubon*
Parsley, Stone	*Bubon*
Parsnep	*Pastinaca*
Pasque Flower	*Anemone*
Passion Flower	*Passiflora*
Patience	*Rumex*
Paul's Betony	*Veronica*
Pea	*Pisum*
Pea, Crown	*Pisum*
Pea, Everlasting	*Lathyrus*
Pea, Heart	*Cardiospermum*
Pea, Heath	*Orobus*
Pea, Painted Lady	*Lathyrus*
Pea, Pigeon	*Cytisus*
Pea, Scarlet	*Lathyrus*
Pea, Sweet	*Lathyrus*
Pea, Tangier	*Lathyrus*
Pea, Winged	*Lotus*
Pea, Wood	*Orobus*
Peach Tree	*Amygdalus*
Peach, Wolf's	*Solanum*
Pear Tree	*Pyrus*
Pear, Avocado	*Laurus*
Pear, Prickly	*Cactus*
Pear, Garlic	*Cratæva*
Peerless Primrose	*Narcissus*
Pellitory, Bastard	*Achilleas*
Pellitory of Spain	*Anthemis*
Penguin	*Bromelia*
Penny Royal	*Mentha Pulegium*
Penstemon	*Chelone*
Peony	*Pæonia*
Pepper	*Piper*
Pepper, Bell	*Capsicum*
Pepper, Bird	*Capsicum*
Pepper, Grape	*Vitis*
Pepper, Guinea	*Capsicum*
Pepper, Jamaica	*Myrtus*
Peppermint	*Mentha*
Pepper, Wall	*Sedum*
Pepper Wort	*Lepidium*
Periwincle	*Vinca*
Perola	*Momordica*
Persea	*Laurus*
Persian Lily	*Fritillaria*
Persica	*Amygdalus*
Persicaria	*Polygenum*
Persimon Plum	*Diospyros*
Peruvian Mastic Tree	*Schinus*
Petola	*Momordica*
Petty Whin	*Genista*
Pheasant's Eye	*Adonis*
Pheasant's Eye	*Dianthus*
Phillyrea, Cape	*Cassine*
Phillyrea, Common	*Phillyrea*
Phillyrea, False	*Rhamnus*
Phu	*Valeriana*
Physic Nut	*Jatropha*
Pigeon Pea	*Cytisus*
Pimento (Allspice)	*Myrtus*
Pimpernel	*Anagallis*
Pinaster	*Pinus*
Pinea	*Pinus*
Pine Apple	*Bromelia*
Pine, Screw	*Pandanus*
Pine Tree	*Pinus*
Pinguin	*Bromelia*
Pink	*Dianthus*
Pink, Indian	*Dianthus*
Pink, Mule	*Dianthus*
Pink, Sea	*Statice*
Pin Pillow	*Cactus*
Pipe	*Syringa*
Pipe Tree, Pudding	*Cassia*
Piper	*Capsicum*
Piper, Jamaica	*Myrtus Pimenta*
Piperidge Tree	*Berberis*
Pippin	*Pyrus*
Piquettes	*Dianthus*
Pishamin Plum	*Diospyros*
Pistachia Nut	*Pistachia*
Pitch Tree	*Pinus*
Plane Tree	*Platanus*
Plane Tree, False	*Acer*
Plantain Tree	*Heliconia*
Plant, Burning Thorny	*Euphorbia*
Plant, Egg	*Solanum*
Plant, Humble	*Mimosa*
Plant, Ice	*Mesembryanthemum*
Plant, Sensitive	*Mimosa*
Plant, Bastard Sensitive	*Æschynomene*
Pliant Mealy Tree	*Viburnum*
Plowman's Spikenard	*Baccharis*
Plowman's Spikenard	*Conyza*
Plum	*Prunus*
Plum, American Black	*Chrysobalanus*
Plum, Bay	*Psidium*
Plum, Brasilian	*Spondias*
Plum, Indian Date	*Diospyros*
Plum, Pishamin or Persimon	*Diospyros*
Poison Ash	*Rhus*
Poison Nut	*Strychnos*
Poison Oak	*Rhus*
Poison Tree	*Rhus*
Polyanthus Narcissus	*Narcissus*
Polyanthus	*Primula*
Poly, Mountain	*Teucrium*
Pomegranate	*Punica*
Pompion	*Cucurbita*
Pomum	*Pyrus*
Poplar Tree	*Populus*
Poppy	*Papaver*
Poppy, Horned	*Chelidonium*
Poppy, Prickly	*Argemone*
Porrum	*Allium*
Potatoes	*Solanum*
Potatoes, Canada	*Helianthus*
Potatoes, Spanish	*Convolvulus*
Prickly Pear	*Cactus*
Prick-wood	*Euonymus*
Primrose	*Primula*
Primrose, Nightly, or Tree	*Œnothera*
Primrose, Peerless	*Narcissus*
Prince's Feather	*Amaranthus*
Prince's Wood	*Cordia* and *Hamelia*
Privet	*Ligustrum*
Privet, Evergreen	*Ligustrum*
Privet, Mock	*Phillyrea*
Pseudo Acacia	*Robinia*
Pseudo Acorus	*Iris*
Pseudo Asphodelus	*Anthericum*
Pseudo Capsicum	*Solanum*
Pseudo Digitalis	*Dracocephalum*
Puccoon	*Sanguinaria*
Pudding Grass	*Mentha Pulegium*
Pudding-pipe Tree	*Cassia*

Pulsatilla, or Pasque Flower	*Anemone*
Pumpion, or Pumpkin	*Cucurbita*
Purging Nut	*Jatropha*
Purple Apple	*Annona*
Purslane	*Portulaca*
Purslane, Sea	*Atriplex*
Purslane Tree	*Portulacaria*
Pyracantha	*Mespilus*
Quamoclit	*Ipomæa*
Queen of the Meadows	*Spiræa*
Queen's Balm	*Dracocephalum*
Queen's Gilliflowers	*Hesperis*
Queen Marguerette	*Aster*
Queen's Violet	*Hesperis*
Queen-stock Gilliflower	*Cheiranthus*
Quick	*Cratægus*
Quicken Tree	*Sorbus*
Quick-beam Tree	*Sorbus*
Quince, Bastard	*Mespilus*
Quince Tree	*Pyrus Cydonia*
Radish	*Raphanus*
Radish, Black Spanish	*Raphanus*
Radish, Horse	*Cochlearia*
Radish, Turnep	*Raphanus*
Ragged Robin	*Lychnis*
Ragwort	*Senecio*
Ragwort, Sea	*Cineraria*
Ragwort, African	*Othonna*
Rampions	*Campanula*
Ramsons	*Allium*
Randia	*Gardenia*
Ranunculus, Common	*Ranunculus*
Ranunculus, Globe	*Trollius*
Rape	*Brassica*
Raspberry	*Rubus*
Rattle, Red	*Pedicularis*
Rattlesnake Root	*Polygala*
Rattle, Yellow	*Rhinanthus*
Red Cedar	*Juniperus*
Reed, Bamboo	*Arundo*
Reed, Common	*Arundo*
Reed, Spanish or Portugal	*Arundo*
Reed, Indian Flowering	*Canna*
Rest Harrow	*Ononis*
Rhodia	*Rhodiola*
Rhubarb	*Rheum*
Rhubarb, Monk's	*Rumex*
Rhus Cobbe	*Schmidelia*
Roan Tree	*Sorbus*
Robert, Herb	*Geranium*
Robinson Crusoe's Boat	*Cactus*
Rocambole	*Allium*
Rock Rose	*Cistus*
Rocket	*Brassica*
Rocket, Dame's Violet, or Gilliflower	*Hesperis*
Rocket, Bastard	*Reseda*
Rocket, Night-smelling	*Hesperis*
Rod, Aaron's	*Solidago*
Rod, Golden	*Solidago*
Rod Tree, Golden	*Bosea*
Root, China	*Smilax*
Root, False China	*Senecio*
Root, Hollow	*Adoxa*
Root, Rose	*Rhodiola*
Root, Rattle-snake	*Polygala*
Root, Snake	*Aristolochia*
Root, Sweet	*Rosa*
Rose Bay	*Nerium*
Rose Bay, Dwarf	*Rhododendron*
Rose Bay, Mountain	*Rhododendron*
Rose Bay, Willow Herb	*Epilobium*
Rose Campion	*Agrostemma*
Rose, China	*Hibiscus*
Rose, Christmas	*Helleborus*
Rose, Corn	*Paparer*
Rose, Guelder	*Viburnum*
Rose, Japan	*Camellia*
Rose Mallow	*Alcea*
Rosema y	*Rosmarinus*
Rosemary, Wild	*Ledum*
Rose of Jericho	*Anastatica*
Rose, Rock	*Cistus*
Rose Root	*Rhodiola*
Rue	*Ruta*
Rue, Meadow	*Thalictrum*
Rush, Flowering	*Butomus*
Rush, Sweet	*Acorus*
Ruyschiana	*Dracocephalum*
Sabina	*Juniperus*
Safflower	*Carthamus*
Saffron	*Crocus*
Saffron, Meadow	*Colchicum*
Sage	*Salvia*
Sage, Indian Wild	*Lantana*
Sage of Jerusalem	*Phlomis*
Sage Tree	*Phlomis*
Sage, Wood	*Teucrium*
Saint Andrew's Cross	*Ascyrum*
Saint Barnaby's Thistle	*Centaurea*
Saint Bruno's Lily	*Anthericum*
Saint-foin	*Hedysarum*
Saint John's Bread	*Ceratonia*
Saint John's Wort	*Hypericum*
Saint Peter's Wort	*Ascyrum*
Saint Peter's Wort, Shrubby	*Lonicera*
Sallad, Corn	*Valeriana*
Sallow	*Salix*
Sambac	*Jasminum*
Samphire	*Crithmum*
Sand Box Tree	*Hura*
Sancile, Bear's Ear	*Cortusa*
Sapota, Mammee	*Achras*
Sapota Tree	*Achras*
Sarsaparilla	*Smilax*
Sassafras	*Laurus*
Satin Flower	*Lunaria*
Satin, White	*Lunaria*
Savin	*Juniperus*
Savory	*Satureia*
Savoy, Cabbage	*Brassica*
Savoy, Spiderwort	*Anthericum*
Saw Wort	*Serratula*
Saxifrage	*Saxifraga*
Saxifrage, Golden	*Chrysosplenium*
Scabious	*Scabiosa*
Scallion	*Allium*
Scarlet Bean	*Phaseolus*
Scarlet Cardinal Flower	*Lobelia*
Scarlet Convolvulus	*Ipomæa*
Scarlet Horse Chesnut	*Pavia*
Scarlet Jasmine	*Bignonia*
Scarlet Lupin	*Lathyrus*
Scarlet Lychnis	*Lychnis*
Scarlet Oak	*Quercus*
Scorpion Senna	*Coronilla*
Scotch Fir	*Pinus*
Scotch Kale	*Brassica*
Screw Pine	*Pandanus*
Screw Tree	*Helicteres*

Scull Cap	*Scutellaria*
Scurvy Grass	*Cochlearia*
Sea Buckthorn	*Hippophae*
Sea Cabbage	*Crambe*
Sea Daffodil	*Pancratium*
Sea Grape	*Coccoloba*
Sea Holly	*Eryngium*
Sea Laurel	*Phyllonthus*
Sea Laurel	*Xylophylla*
Sea Lavender	*Statice*
Sea Onion	*Scilla*
Sea Pea	*Pisum*
Sea Pink	*Cerastium*
Sea Pigeon-pea	*Sophora*
Sea Purslane	*Atriplex*
Sea-side Grape	*Coccoloba*
Seal, Solomon's	*Convallaria*
Sebesten	*Cordia*
Sedum, Lesser Houseleek	*Sedum*
Sedum Tree	*Sempervivum*
Sena	*Cassia*
Senega, Rattle-snake Root	*Polygala*
Sengreen	*Saxifraga*
Senna	*Cassia*
Senna, Bladder	*Colutea*
Senna, Scorpion	*Coronilla*
Senna, Wild	*Cassia*
Sensitive Plant	*Mimosa*
Sensitive Plant, Bastard	*Æschynomene*
Service Tree	*Sorbus*
Service Tree, Bird's	*Sorbus*
Service Treet, Sweet	*Sorbus*
Service Tree, Maple-leaved	*Cratægus*
Service Tree, Wild	*Cratægus*
Shaddock	*Citrus*
Shallot	*Allium*
Shot, Indian	*Canna*
Siberian Crab	*Pyrus*
Side-saddle Flower	*Sarracenia*
Silk Cotton Tree	*Bombax*
Silk, Virgin	*Periploca*
Silver Bush	*Anthyllis*
Silver Fir	*Pinus*
Silver Tree	*Protea*
Simpler's Joy	*Verbena*
Skirret	*Sium*
Skull Cap	*Scutellaria*
Sky Flower	*Cineraria*
Slipper, Lady's	*Cypripedium*
Slipper Wort	*Calceolaria*
Smallage	*Apium*
Snail Flower	*Phaseolus*
Snail Plant	*Medicago*
Snail Trefoil	*Medicago*
Snake, Cucumber	*Cucumis*
Snake, Gourd	*Trichosanthes*
Snake Root	*Aristolochia*
Snake Root, Rattle	*Polygala*
Snap Dragon	*Antirrhinum*
Snap Tree	*Justicia*
Sneeze Wort	*Achillea*
Snow-ball Tree	*Viburnum*
Snow-berry Tree	*Chiococca*
Snow-drop	*Galanthus*
Snow-drop, Greater	*Leucojum*
Snow-drop Tree	*Chionanthus*
Soap Berry	*Sapindus*
Soap-wort, American	*Rauvia*
Soap-wort	*Saponaria*
Soldier Wood	*Mimosa*
Solomon's Seal	*Convallaria*
Sope Berry	*Sapindus*
Sope-wort	*Saponaria*
Sorb Tree	*Sorbus*
Sorb Tree, Wild	*Sorbus*
Sorrel	*Rumex*
Sorrel Tree	*Andromeda & Rumex*
Sorrel, Wood	*Oxalis*
Sorrowful Tree	*Nyctanthes*
Sour Gourd	*Adansonia*
Sour Gourd, Æthiopian	*Adansonia*
Sour Sop	*Annona*
Southernwood	*Artemisia*
South-Sea Bread-Fruit Tree	*Artocarpus*
South-sea Tea	*Ilex*
Snow Bread	*Cyclamen*
Spanish Broom	*Spartium*
Spanish Elm	*Cordia*
Spanish Potatoes	*Convolvulus*
'Sparagus	*Asparagus*
Sparrow Wort	*Passerina*
Spearage	*Asparagus*
Spear, King's	*Asphodelus*
Spearmint	*Mentha*
Speedwell	*Veronica*
Sperage	*Asparagus*
Spice, All	*Myrtus*
Spice, Carolina All	*Calycanthus*
Spider Wort	*Anthericum*
Spider Wort, Virginia	*Tradescantia*
Spikenard	*Baccharis*
Spinach	*Spinacia*
Spinach, Strawberry	*Blitum*
Spindle Tree	*Euonymus*
Spindle Tree, Bastard	*Celastrus*
Spirting Cucumber	*Momordica*
Spiræa Frutex	*Spiræa*
Spiræa, African	*Diosma*
Sponge Tree	*Mimosa*
Spoon Wort	*Cochlearia*
Spruce Fir	*Pinus*
Spurge	*Euphorbia*
Spurge Laurel	*Daphne*
Spurge Olive	*Daphne*
Squash Gourd	*Cucurbita*
Squill	*Scilla*
Squill, Lesser White	*Pancratium*
Squirting Cucumber	*Momordica*
Staff Tree	*Celastrus*
Stag's Horn Tree	*Rhus*
Star Apple	*Chrysophyllum*
Star Flower	*Amellus*
Star Flower	*Ornithogalum*
Star Hyacinth	*Scilla*
Star of Bethlehem	*Ornithogalum*
Star of Naples	*Ornithogalum*
Star Thistle	*Centaurea*
Star Wort	*Aster*
Star Wort, Bastard	*Buphthalmum*
Stave's Acre	*Delphinium*
Stock, Dwarf, Annual	*Cheiranthus*
Stock Gilliflower	*Cheiranthus*
Stock, Ten Weeks	*Cheiranthus*
Stock, Virgin	*Cheiranthus*
Stonecrop	*Sedum*
Stonecrop Tree	*Chenopodium*
Storax	*Styrax*
Storax, Liquid	*Liquidambar*
Stramonium	*Datura*
Strawberry	*Fragaria*
Strawberry Blite	*Blitum*
Strawberry Spinach	*Blitum*

Strawberry Tree	*Arbutus*
Styrax	*Liquidambar*
Suber	*Quercus*
Succory	*Cichorium*
Sugar Cane	*Saccharum*
Sugar Maple	*Acer*
Sultan Flower	*Centaurea*
Sultan, Sweet	*Centaurea*
Sumach	*Coriaria* and *Rhus*
Sumach, Currier's	*Coriaria*
Sumach, Myrtle-leaved	*Coriaria*
Summer Cypress	*Chenopodium*
Sun Dew	*Drosera*
Sun Flower	*Helianthus*
Sun Flower, Dwarf American	*Rudbeckia*
Sunflower, Little	*Cistus*
Sunflower, Tick-seeded	*Coreopsis*
Sun Spurge	*Euphorbia*
Superb Lily	*Gloriosa*
Supple Jack	*Rhamnus*
Swallow Wort	*Asclepias*
Swallow Wort, African	*Stapelia*
Sweet Apple	*Annona*
Sweet Brier	*Rosa*
Sweet Flag	*Acorus*
Sweet Gum	*Liquidambar*
Sweet Johns	*Dianthus*
Sweet Maudlin	*Achillea*
Sweet Pea	*Lathyrus*
Sweet Root	*Glycyrrhiza*
Sweet Rush	*Acorus*
Sweet Sop	*Annona*
Sweet Sultan	*Centaurea*
Sweet Weed	*Capraria* & *Scoparia*
Sweet William	*Dianthus*
Sweet Willow	*Myrica*
Sycamore Tree	*Acer*
Sycamorus Fig	*Ficus*
Syringa	*Philadelphus*
Tacamahaca	*Populus*
Tallow Tree	*Croton*
Tamarind Tree	*Tamarindus*
Tamarisk	*Tamarix*
Tansy	*Tanacetum*
Tar Tree	*Pinus*
Tarragon	*Artemisia*
Tarton-raire	*Daphne*
Tea, Buckthorn	*Rhamnus*
Tea, New Jersey	*Ceanothus*
Tea, New Zealand	*Philadelphus*
Tea, Oswego	*Monarda*
Tea, South Sea	*Ilex*
Tea Tree	*Thea*
Tea, West Indian	*Sida*
Thistle, Globe	*Echinops*
Thistle, Melon	*Cactus*
Thistle, Torch	*Cactus*
Thorn Apple	*Datura*
Thorn, Box	*Lycium*
Thorn, Christ's	*Rhamnus*
Thorn, Cockspur	*Cratægus*
Thorn, Egyptian	*Acacia*
Thorn, Evergreen	*Mespilus*
Thorn, Glastonbury	*Cratægus*
Thorn, Goat's	*Tragacanthus*
Thorn, Haw	*Cratægus*
Thorn, Lily	*Catesbæa*
Thorn, Purging	*Rhamnus*
Thorn, White	*Cratægus*
Thorny Trefoil	*Fagonia*
Thorow Wax	*Buplcurum*
Thrift	*Statice*
Throat Wort	*Campanula*
Throat Wort, Blue Umbelliferous	*Trachelium*
Thuya	*Thuja*
Thyme	*Thymus*
Thyme, Mastic	*Satureia*
Thyme, Mother-of-	*Thymus*
Tickseed Sun-flower	*Coreopsis*
Tinus	*Viburnum*
Toad Flax	*Antirrhinum*
Tobacco	*Nicotiana*
Tolu Tree	*Toluifera*
Tomatoes	*Solanum*
Toothach Tree	*Xanthoxylum*
Torch Thistle	*Cactus*
Touch me Not	*Impatiens*
Touch me Not	*Momordica*
Toxicodendron	*Rhus*
Tragacanth, Gum	*Astragalus*
Traces, Ladies'	*Ophrys*
Trailing Arbutus	*Epigæa*
Traveller's Joy	*Clematis*
Tree Celandine	*Bocconia*
Tree Germander	*Teucrium*
Tree, Mallow	*Lavatera*
Tree, Primrose	*Œnothera*
Tree of Life	*Thuya*
Trefoil, Shrubby	*Ptelea*
Trefoil, Moon	*Medicago*
Trefoil, Snail	*Medicago*
Trefoil, Bean	*Cytisus*
Trefoil, Tree	*Cytisus*
Tricolor	*Amaranthus*
Tricolor	*Viola*
Trumpet Flower	*Bignonia*
Trumpet, Honeysuckle	*Lonicera*
Tuberose	*Polyanthus*
Tulip	*Tulipa*
Tulip, African	*Hæmanthus*
Tulip, Chequered	*Fritillaria*
Tulip Flower	*Bignonia*
Tulip Tree	*Liriodendron*
Tulip Tree, Laurel-leaved	*Magnolia*
Tupelo Tree	*Nissa*
Turkey Berry Tree	*Cordia*
Turkey Wheat	*Zea*
Turk's Cap	*Lilium*
Turnep	*Brassica*
Turnep, French	*Brassica*
Turnep, Cabbage	*Brassica*
Turnep, Radish	*Raphanus*
Turnsole	*Croton*
Turnsole	*Heliotropium*
Turpentine Tree	*Pistacia*
Tutsan	*Hypericum*
Tway Blade	*Ophrys*
Twopence, Herb	*Lysimachia*
Umbrella Tree	*Magnolia*
Valerian	*Valeriana*
Valerian, Greek	*Polemonium*
Varnish Tree	*Rhus*
Venus's Comb	*Scandix*
Venus's Fly Trap	*Dionæa*
Venus's Looking-glass	*Campanula*
Venus's Navel-wort	*Cynoglossum*
Vervain	*Verbena*
Vervain Mallow	*Malva*
Vetch, Bitter	*Orobus*

Vetch, Liquorice	*Astragalus*
Vetch, Kidney	*Anthyllis*
Vetch, Knob-rooted Liquorice	*Glycine*
Viburnum, American	*Lantana*
Vine	*Vitis*
Vine, Black	*Tamus*
Violet	*Viola*
Violet, Dame's	*Hesperis*
Violet, Damask	*Hesperis*
Violet, Dog's Tooth	*Erythronium*
Viper Grass	*Scorzonera*
Virga Aurea	*Solidago*
Virginian Acacia	*Robinia*
Virginian Creeper	*Clematis*
Virginian Guelder Rose	*Spiræa*
Virginian Pike	*Phytolacca*
Virginian Silk	*Periploca*
Virgin's Bower	*Clematis*
Vitæ, Arbor	*Thuya*
Vitæ, Lignum	*Guaiacum*
Wake Robin	*Arum*
Wall Flower	*Cheiranthus*
Wall Pepper	*Sedum*
Walnut Tree	*Juglans*
Walnut Tree, Jamaica	*Hura*
Wartwort	*Euphorbia*
Water-cress	*Sisymbrium*
Water Lily	*Nymphæa*
Water Melon	*Cucurbita*
Wayfaring Tree	*Viburnum*
Wheat, Indian	*Zea*
Wheat, Turkey	*Zea*
Whin	*Ulex*
Whin, Petty	*Genista*
White Beam	*Cratægus*
White Leaf	*Cratægus*
White Thorn	*Cratægus*
Wicker Tree	*Sorbus*
Widow Wail	*Cneorum*
Wild Olive	*Elæagnus*
Willow	*Salix*
Willow, French	*Epilobium*
Willow Herb	*Lythrum*
Willow Herb	*Lysimachia*
Willow, Spiked	*Spiræa*
Willow, Sweet	*Myrica*
Wind Flower	*Anemone*
Wind Seed	*Arctotis*
Winter's Bark	*Winteria*
Winter Berry	*Prinos*
Winter Bloom	*Azalea*
Winter Cherry	*Physalis*
Winter Cherry	*Solanum*
Winter Savory	*Satureia*
Woodbine	*Lonicera*
Wood, Waxen	*Genista*
Wormwood Tree	*Artemisia*
Wood of Life	*Guaiacum*
Wound Wort	*Achillea*
Xiphium, Bulbous	*Iris*
Xylosteum	*Lonicera*
Yapon	*Ilex*
Yarrow	*Achillea*
Yarva Mora	*Bosea*
Yew Tree	*Taxus*
Zealand Tea, New	*Philadelphus*
Zerumbet	*Amomum*
Zinziber	*Amomum*
Ziziphus	*Rhamnus*

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ENGLISH NAMES OF THE PLANTS REPRESENTED IN THE PLATES.

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African Lily	*Agapanthus*		
Albuca, Lesser	*Albuca Minor*	2	4
Allspice, Carolina	*Calycanthus Floridus*	1	13
Alpine Eryngo	*Eryngium Alpinum*	2	23
Alpine Soldanella	*Soldanella Alpina*	2	41
Althea Frutex	*Hibiscus Syriacus*	2	28
Alyssum, Yellow	*Alyssum Saxatile*	2	5
American Globe Flower	*Trollius Americanus*	1	57
American Herb Christopher	*Actæa Racemosa*	4	2
Annual Lavatera	*Lavatera Trimestris*	1	33
Ash-leaved Trumpet Flower	*Bignonia Radicans*	1	10
Asphodel, Yellow	*Asphodelus Luteus*	2	3
Aster, Italian	*Aster Amellus*	1	7
Æthiopian Calla	*Calla Æthiopica*	1	12
Autumnal Crocus	*Colchicum Autumnale*	2	15
Azalea, Scarlet	*Azalea Nudifera Coccinea*	2	9
Bell-flowered Squill	*Scilla Campanulata*	2	51
Berry-headed Strawberry Blite	*Blitum Capitatum*	3	2
Blue Catananche	*Catananche Cærulea*	3	15
Blue-Flowered Lathyrus	*Lathyrus Sativus*	2	33
Blue Greek Valerian	*Polemonium Cæruleum*	2	44
Box-leaved Milk Wort	*Polygala Chamæ-Buxus*	2	45
Broom, Spanish	*Spartium Junceum*	3	54
Bugloss, Officinal	*Anchusa Officinalis*	2	2
Bulbocodium, Spring	*Bulbocodium Vernum*	2	11
Calla, Æthiopian	*Calla Æthiopica*	1	12
Campanula, Nettle-leaved	*Campanula Rapunculoides*	1	14
Canadian Columbine	*Aquilegia Canadensis*	3	2
Candy Tuft (Gibraltar)	*Iberis Gibraltarica*	2	29
Canna-leaved Strelitzia	*Strelitzia Regina*	2	53
Cardinal Flower	*Lobelia Cardinalis*	1	35
Carolina Allspice	*Calycanthus Floridus*	1	13
Chaste Tree, Five-leaved	*Vitex Negundo*	2	60
Chelone, Red-flowered	*Chelone Obliqua*	1	15
Cherry, Water	*Physalis Alkekengi*	3	45
Chinese Ixia	*Ixia Chinensis*	1	29
Chinese Water Lily	*Nelumbium Speciosum*	1	38
Cobweb Houseleek	*Sempervivum Arachnoideum*	1	53
Columbine, Canadian	*Aquilegia Canadensis*	3	2

INDEX TO THE ENGLISH NAMES OF THE PLANTS REPRESENTED IN THE PLATES.

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Common Bladder Senna	*Colutea Arborescens*	2	18
Common Passion Flower	*Passiflora Cærulea*	2	43
Common Philadelphus	*Philadelphus Coronarius*	1	43
Convolvulus, Small Blue	*Convolvulus Tricolor*	3	14
Creeping Money Wort	*Lysimachia Nummularia*	3	34
Creeping-rooted Hedysarum	*Hedysarum Obscurum*	2	32
Crocus, Autumnal	*Colchicum Autumnale*	2	15
Crocus, Spring	*Crocus Vernus*	2	19
Crown, Imperial	*Fritillaria Imperialis*	1	25
Cyclamen, Persian	*Cyclamen Persicum*	1	19
Dahlia, Purple	*Dahlia Pinnata*	1	19*
Dahlia, Yellow	*Dahlia Crocata*	2	19*
Daphne, Trailing	*Daphne Cneorum*	1	20
Devil-in-a-Bush	*Nigella Damascena*	1	37
Dingy-Flowered Glycine	*Glycine Rubicunda*	2	26
Dittany of Crete	*Origanum Dictamnus*	2	39
Dodecatheon, Mead's	*Dodecatheon Medea*	1	22
Dog's Bane, Fly-catching	*Apocynum Androsæmifolium*	1	8
Double Purple Groundsel	*Senecio Elegans*	2	54
Dragon's Head, Virginian	*Dracocephalum Virginianum*	2	20
Eastern Comfrey	*Symphytum Orientale*	1	48
Eastern Poppy	*Papaver Orientale*	1	42
Eryngo, Alpine	*Eryngium Alpinum*	2	23
Evergreen Orpine	*Sedum Anacampseros*	1	52
Feathered Columbine	*Thalictrum Aquilegifolium*	3	56
Feather, Prince's	*Amaranthus Hypochondriacus*	2	7
Five-leaved Chaste Tree	*Vitex Negundo*	2	60
Five-leaved Pæony	*Pæonia Tenuifolia*	2	40
Flowering Rush	*Butomus Umbellatus*	2	10
Fly-catching Dog's Bane	*Apocynum Androsæmifolium*	1	8
Fœtid St. John's Wort	*Hypericum Hircinum*	2	27
Fumitory, Hollow-rooted	*Fumaria Cava*	2	25
Gentian, Large-flowered	*Gentiana Acaulis*	1	26
German Iris	*Iris Germanica*	1	30
Gibraltar Candy Tuft	*Iberis Gibraltarica*	2	29
Glaucous Kalmia	*Kalmia Glauca*	1	31
Globe Flower, American	*Trollius Americanus*	1	57
Glycine, Dingy-flowered	*Glycine Rubicunda*	2	26
Great-flowered Heath	*Erica Grandiflora*	1	24
Great Globe Thistle	*Echinops Sphærocephalus*	1	23
Great Honey Wort	*Cerinthe Major*	2	16
Greater Nasturtium	*Tropæolum Majus*	2	57
Green Hellebore	*Helleborus Viridis*	1	27
Gum Cistus	*Cistus Ladaniferus*	1	17
Hare's Ear, Shrubby	*Bupleurum Fruticosum*	1	11
Hawk Weed, Yellow	*Crepis Barbata*	2	14
Heath, Great-flowered	*Erica Grandiflora*	1	24
Hedysarum, Creeping-rooted	*Hedysarum Obscurum*	2	32
Hellebore, Green	*Helleborus Viridis*	1	27
Hollow-rooted Fumitory	*Fumaria Cava*	2	25
Honey Wort, Great	*Cerinthe Major*	2	16
Houseleek Cobweb	*Sempervivum Arachnoideum*	1	53
Imperial, Crown	*Fritillaria Imperialis*	1	25
Indian Sage	*Salvia Indica*	2	48
Iris, German	*Iris Germanica*	1	30
Iris, Various-coloured	*Iris Versicolor*	2	30
Iris, Variegated	*Iris Variegata*	3	30
Iris-leaved Sisyrinchium	*Sisyrinchium Iridioides*	2	55
Italian Aster	*Aster Amellus*	1	7
Jonquille	*Narcissus Jonquilla*	2	37
Kalmia, Glaucous	*Kalmia Glauca*	1	31
Laburnum	*Cytisus Laburnum*	2	18
Large-flowered Gentian	*Gentiana Acaulis*	1	26
Larkspur	*Delphinium Elatum*	1	21
Lathyrus, Blue-flowered	*Lathyrus Sativus*	2	33
Laurustinus	*Viburnum Tinus*	2	59
Lavatera, Annual	*Lavatera Trimestris*	1	33
Lesser Albuca	*Albuca Minor*	2	4
Lilac	*Syringa Vulgaris*	1	50
Lily, Chinese Water	*Nelumbium Speciosum*	1	38
Lily-of-the-Valley	*Convallaria Majalis*	1	16
Lily, Town	*Hemerocallis Fulva*	1	28
Lily, White	*Lilium Candidum*	2	35
Lobe-leaved Meadow Sweet	*Spiræa Lobata*	1	55
Love-in-a-Mist	*Nigella Damascena*	1	37
Lung-Wort, Virginian	*Pulmonaria Virginica*	2	42
Lychnis, Scarlet	*Lychnis Chalcedonica*	1	34
Madagascar Periwinkle	*Vinca Rosea*	1	59
Marvel of Peru	*Mirabilis Jalapa*	1	36
Meadow Sweet, Lobe-leaved	*Spiræa Junceum*	3	54
Mead's Dodecatheon	*Dodecatheon Medea*	1	22
Mexican Argemone	*Argemone Mexicana*	1	9
Milk-Wort, Box-leaved	*Polygala Chamæ-Buxus*	2	45
Money-Wort, Creeping	*Lysimachia Nummularia*	3	34
Nettle-leaved Campanula	*Campanula Rapunculoides*	1	14
New Jersey Tea Tree	*Ceanothus Americanus*	3	13
Nolana, Trailing	*Nolana Prostrata*	2	38
Officinal Bugloss	*Anchusa Officinalis*	2	2
Orange Apocynum	*Asclepias Canadensis*	3	2
Oxlip	*Primula Veris*	1	40
Panicled Lychnidea	*Phlox Paniculata*	1	45
Panicled Wachendorfia	*Wachendorfia Paniculata*	1	60
Pæony, Fine-leaved	*Pæonia Tenuifolia*	2	40
Passion Flower, Common	*Passiflora Cærulea*	2	43
Perennial Sun-Flower	*Helianthus Multiflorus*	1	32
Periwinkle, Madagascar	*Vinca Rosea*	1	59
Persian Cyclamen	*Cyclamen-Persicum*	1	19
Peru, Marvel of	*Mirabilis Jalapa*	1	36
Philadelphus, Common	*Philadelphus Coronarius*	1	43
Pontic Rhododendron	*Rhododendron Ponticum*	1	47
Poppy, Eastern	*Papaver Orientale*	1	42
Poppy, Yellow-horned	*Chelidonium Glaucum*	2	17
Prince's Feather	*Amaranthus Hypochondriacus*	2	7
Purple Dahlia	*Dahlia Pinnata*	1	19*
Purple Rudbeckia	*Rudbeckia Purpurea*	1	46
Red-flowered Chelone	*Chelone Obliqua*	1	15
Red Valerian	*Valeriana Rubra*	1	58
Rose Acacia	*Robinia Hispida*	2	47
Rose Bay, Willow Herb	*Epilobium Angustifolium*	2	24
Rose Campion	*Agrostemma Coronaria*	1	2
Rudbeckia, Purple	*Rudbeckia Purpurea*	1	46
Rush, Flowering	*Butomus Umbellatus*	2	10
Sage, Indian	*Salvia Indica*	2	48
Sarracena, Yellow	*Sarracena Flava*	2	50
Savoy Anthericum	*Anthericum Hortensis*	1	4
Scabious, Sweet	*Scabiosa Atropurpurea*	1	51
Scarlet Azalea	*Azalea Nudiflora Coccinea*	2	9
Scarlet-flowered Crassula	*Crassula Coccinea*	1	15
Scarlet Lobelia, or Cardinal Flower	*Lobelia Cardinalis*	1	36
Scorpion Senna	*Coronilla Emeris*	2	12
Sea Pancratium	*Pancratium Maritimum*	1	41
Senna, Scorpion	*Coronilla Emeris*	2	12

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Sessile Trillium	*Trillium Sessile*	2	5
Shrubby Hare's Ear	*Bupleurum Fruticosum*	1	2
Shrubby Œnothera	*Œnothera Fruticosa*	1	39
Siberian Speedwell	*Veronica Sibirica*	2	58
Single Yellow Rose	*Rosa Lutea*	2	46
Sisyrinchium, Iris-leaved	*Sisyrinchium Irioides*	2	55
Small Blue Convolvulus	*Convolvulus Tricolor*	3	14
Soldanella, Alpine	*Soldanella Alpina*	2	41
Sophora, Winged-podded	*Sophora Tetraptera*	2	52
Spanish Broom	*Spartium Junceum*	3	54
Speedwell, Siberian	*Veronica Sibirica*	2	58
Spider-Wort, Virginian	*Tradescantia Virginica*	1	56
Spring Bulbocodium	*Bulbocodium Vernum*	2	2
Spring Crocus	*Crocus Vernus*	2	19
Spring Snow-flake	*Leucojum Vernum*	2	34
Squill, Bell-flowered	*Scilla Campanulata*	2	51
Star Anemone	*Anemone Hortensis*	1	4
Strawberry Tree	*Arbutus Unedo*	1	5
Strelitzia, Canna-leaved	*Strelitzia Regina*	2	53
Sun Flower, Perennial	*Helianthus Multiflorus*	1	32
Sweet Scabious	*Scabiosa Atropurpurea*	1	51
Sweet William	*Dianthus Barbatus*	2	21
Syringa, or Mock Orange	*Philadelphus Coronarius*	1	44
Tea Tree, New Jersey	*Ceanothus Americanus*	3	13
Thistle, Great Globe	*Echinops Sphærocephalus*	1	23
Town Lily	*Hemerocallis Fulva*	1	28
Trailing Daphne	*Daphne Cneorum*	1	20
Trailing Nolana	*Nolana Prostrata*	2	38
Tree Flax	*Linum Arboreum*	2	31
Trumpet Flower, Ash-leaved	*Bignonia Radicans*	1	10
Valerian, Red	*Valeriana Rubra*	1	58
Various-coloured Iris	*Iris Versicolor*	2	30
Variegated Iris	*Iris Variegata*	3	30
Virginian Dragon's Head	*Dracocephalum Virginianum*	2	20
Virginian Lung-wort	*Pulmonaria Virginica*	2	42
Wachendorfia, Panicled	*Wachendorfia Paniculata*	1	6
Winter Cherry	*Physalis Alkekengi*	3	45
White Fraxinella	*Dictamnus Albus*	2	22
White Lily	*Lilium Candidum*	2	35
William, Sweet	*Dianthus Barbatus*	2	21
Willow-leaved Golden Rod	*Solidago Stricta*	2	41
Winged-podded Sophora	*Sophora Tetraptera*	2	52
Yellow Alyssum	*Alyssum Saxatile*	2	5
Yellow Asphodel	*Asphodelus Luteus*	2	3
Yellow Dahlia	*Dahlia Crocata*	2	19*
Yellow Hawk Weed	*Crepis Barbata*	2	14

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Actæa Racemosa	American Herb Christopher	4	2
Agapanthus Umbellatus	African Agapanthus	1	3
Agrostemma Coronaria	Rose Campion	1	2
Albuca Minor	Lesser Albuca	2	4
Alyssum Saxatile	Yellow Alyssum	2	5
Amaranthus Hypochondriacus	Prince's Feather	2	7
Amaryllis Formosissima	Jacobean Amaryllis	2	6
Anchusa Officinalis	Officinal Bugloss	2	2
Anemone Hortensis	Star Anemone	1	4
Anthericum Liliastrum	Savoy Anthericum	1	6
Antirrhinum Purpureum	Purple Toad Flax	2	8
Apocynum Androsæmifolium	Fly-catching Dog's Bane	1	8
Aquilegia Canadensis	Canadian Columbine	3	2
Arbutus Unedo	Strawberry Tree	1	5
Argemone Mexicana	Mexican Argemone	1	9
Asclepias Tuberosa	Orange Apocynum	2	1
Asphodelus Luteus	Yellow Asphodel	2	3
Aster Amellus	Italian Aster	1	7
Azalea Nudifera Coccinea	Scarlet Azalea	2	9
Bignonia Radicans	Ash-leaved Trumpet Flower	1	10
Blitum Capitatum	Berry-headed Strawberry Blite	3	11
Bulbocodium Vernum	Spring Bulbocodium	2	11
Bupleurum Fruticosum	Shrubby Hare's Ear	1	11
Butomus Umbellatus	Flowering Rush	2	10
Calla Æthiopica	Æthiopian Calla	1	12
Calycanthus Floridus	Carolina Alspice	1	13
Campanula Rapunculoides	Nettle-leaved Campanula	1	14
Catananche Cærulea	Blue Catananche	3	15
Ceanothus Americanus	New Jersey Tea-Tree	3	13
Cerinthe Major	Great Honey Wort	2	16
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Dahlia Pinnata	Purple Dahlia	1	19*
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[R. TAYLOR and Co. 38, Shoe Lane.]

B.P.L. Bi
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